

CHINATOWN AREA TRANSPORTATION STUDY

FINAL REPORT

Prepared for
City and County of San Francisco

Prepared by
**Korve Engineering, Inc.
and
Parsons Brinckerhoff Quade & Douglas, Inc.**

D

DOCUMENTS DEPT.

July 1, 1996

REF
388.4097
C441

AUG 13 1996

SAN FRANCISCO
PUBLIC LIBRARY



5/S

GOVERNMENT INFORMATION CENTER
SAN FRANCISCO PUBLIC LIBRARY

**SAN FRANCISCO
PUBLIC LIBRARY**

**REFERENCE
BOOK**

Not to be taken from the Library



JAN 17 1997

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	7
1.1 BACKGROUND	7
1.2 PURPOSE OF THE STUDY	7
1.3 ORGANIZATION OF THE REPORT	7
2. IMPLICATION OF 1989 EARTHQUAKE AND TSS/MID -EMBARCADERO PROJECT	8
3. TRAVEL PATTERNS AND TRAFFIC CONDITIONS FOR PRE-EARTHQUAKE, EXISTING AND YEAR 2015 CONDITIONS	12
3.1 TRAFFIC VOLUMES	12
3.2 TRAVEL PATHS/TRAVEL TIMES	15
3.3 INTERSECTION OPERATING CONDITIONS	22
3.4 TRANSIT	25
3.5 TRAVEL DEMAND	25
4. TRAFFIC	32
4.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY	32
4.2 SUMMARY OF ISSUES	33
4.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS	33
5. TRANSIT	38
5.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY	38
5.2 SUMMARY OF ISSUES	38
5.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS	39
6. PARKING/GOODS MOVEMENT	56
6.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY	56
6.2 SUMMARY OF ISSUES	56
6.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS	57
7. PEDESTRIANS	61
7.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY	61
7.2 SUMMARY OF ISSUES	61
7.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS	61
8. SUMMARY OF RECOMMENDATIONS	63
8.1 TRAFFIC SOLUTIONS	63
8.2 TRANSIT	63
8.3 PARKING/GOODS MOVEMENT	65
8.4 PEDESTRIANS	65

REF 388.4097 C441

Chinatown area
transportation study :
1996.

3 1223 04291 8814

S.F. PUBLIC LIBRARY

LIST OF FIGURES

Figure 1	
Pre-earthquake and Existing Traffic Volumes: AM Peak Hour	13
Figure 2	
Pre-earthquake and Existing Traffic Volumes: PM Peak Hour	14
Figure 3	
Pre-earthquake vs. Existing Traffic Volumes at Downtown/Chinatown Area Screenlines	16
Figure 4	
Travel Paths: Existing and No Build Conditions	18
Figure 5	
Travel Paths: Existing and No Build Conditions	19
Figure 6	
Travel Paths: Alternative 3B and Preferred Alternative	20
Figure 7	
Intersection LOS Analysis Locations	24
Figure 8	
Existing Transit Service	26
Figure 9	
MTC Model Traffic Analysis Zones	28
Figure 10	
Bus and Shuttle Improvements	40
Figure 11	
Existing and Planned Light Rail Service	42
Figure 12	
Rail Alternatives	44
Figure 13	
Conceptual Rail Plan - Washington/Jackson Loop	50
Figure 14	
Parking Garage Plan For Chinatown	58

LIST OF TABLES

Table 1	
Travel Times	21
Table 2	
Intersection LOS	23
Table 3	
Year 1990 and 2015 Household and Employment Data	27
Table 4	
Daily Person Trips Produced In and Attracted to Chinatown Area by Year and Mode	29
Table 5	
Vehicle Trips Produced or Attracted in Chinatown Area: AM Peak Hour	30
Table 6	
Vehicle Trips Produced or Attracted in Chinatown Area: PM Peak Hour	30
Table 7	
Transit Evaluation Matrix	45

EXECUTIVE SUMMARY

The purpose of this study was to address comments raised during the public review process for the *Alternatives to Replacement of The Embarcadero Freeway and the Terminal Separator Structure* DEIS/EIR. In particular, a number of comments and concerns were raised regarding the loss of access to Chinatown following the removal of the Embarcadero Freeway. To address these concerns, the Waterfront Transportation Projects Office established a process to hear the comments and concerns of the Chinatown and North Beach communities, evaluate in more detail traffic conditions in the Chinatown area and propose recommendations for improved access.

The process involved a number of meetings with the Chinatown and North Beach communities, including approximately ten working sessions and three publicly noticed meetings between October 1995 and March 1996. The *Draft Chinatown Area Transportation Study* report, dated February 6, 1996, was distributed to the community in February. This final report presents the results of the public participation process, the evaluation of traffic, transit, parking and pedestrian conditions, and recommendations.

The improvements recommended as part of the Chinatown Area Study were further refined to determine which City agency will be responsible for project development and implementation and the time frame for implementation. As a result of discussions between the city agencies and the community, the following Improvement Program, presented as three distinct programs, was developed. The three programs include:

- Interim Improvement Program - 1996 to 1998
- Mid Embarcadero/Terminal Separator Structure Improvement Program - 1999
- Long Range Improvement Program

INTERIM IMPROVEMENT PROGRAM

For each of the projects listed, there will be a deliberate and well thought out plan to engage the larger Chinatown and North Beach communities in both project development and implementation. As the numerical order of the projects listed does not reflect the order of community priority unless otherwise noted, the community should be consulted for prioritization as the projects are implemented.

1996 Implementation Program

The following measures are implementable in the short range by staff or within already identified funding sources. The goal is to complete these projects within the 1996 calendar year. It is proposed that the appropriate city departments and commissions do additional evaluation, as required, and review with the community.

1. **Extend Hours of Peak Period Tow-away Zones** - Extend peak period tow-away from 4:00

to 6:00 PM to 3:00 to 7:00 PM on Sacramento Street (north side) between Kearny and Powell Streets, and on Clay Street (south side) between Walter Lum Place and Kearny Street between 7:00 AM and 6:00 PM. The community is concerned about the impact of this action on merchants, particularly on Sacramento Street where restaurant business could be impacted. However, the need to keep traffic moving and to allow MUNI clear passage, especially on Clay Street, was identified as a problem that needs to be addressed. **Department of Parking and Traffic**

2. **Destination Guide Signs** - Add signing directing travelers into Chinatown along Fremont and Pine Streets and on The Embarcadero at Washington and Broadway, and traffic leaving Chinatown to use Broadway and Clay Street. **Department of Parking and Traffic**
3. **Signing to Parking Facilities** - Sign the following routes to parking garages: Broadway to and from Vallejo Street Garage, Washington/Clay Streets to and from Portsmouth Square Garage, and Third/Fourth Streets to and from Portsmouth, St. Mary's, Sutter/Stockton, and Fifth/Mission Street garages. Provide general signing to private parking garages that are available in the area. **Department of Parking and Traffic**
4. **Increase Parking Enforcement** - Expansion of enforcement efforts for illegally parked vehicles that disrupt the traffic flows, in conjunction with community outreach. This is proposed throughout Chinatown and Union Square, but particularly along critical transit streets such as Stockton, Clay, Sacramento, Kearny, Pacific, and Montgomery. **Department of Parking and Traffic.**
5. **Signal Timing and Interconnections** - The potential for interconnecting Stockton, Grant, and Broadway signals and integrating them into the downtown signal system is currently under review. Chinatown has also requested that an all-pedestrian phase be considered on Stockton Street at intersections from the Stockton tunnel to, but not including, Broadway to facilitate pedestrian flows and vehicular turns. The provision of a westbound left turn bay from Broadway onto Stockton, possibly for buses only, will be evaluated, as will the potential for signal progression on routes leading to parking facilities for example, Fremont, Pine, and Kearny. The impact on transit operations will also be considered. **Department of Parking and Traffic**
6. **Signal timing revisions on Montgomery Street from California to Sutter** - Evaluate reducing the existing signal cycle length to 60 seconds during weekdays and weekends to work more efficiently. **Department of Parking and Traffic**
7. **Promote use of the Golden Gateway Garage Shuttle Service** - Increase signing in the immediate vicinity of the Golden Gateway Garage, including at the private parking facilities, and publish promotional brochures for distribution at merchant locations. Implement informational signing within the garage to direct pedestrians to transit routes to Chinatown. Consider extending the shuttle service one block north to provide direct connection to the Vallejo Street Garage. **Department of Parking and Traffic**

8. **Enhance use of Sutter/Stockton Garage for Chinatown visitors** - Implement informational signing within the garage to direct pedestrians to the quickest walking and transit routes to Chinatown. **Department of Parking and Traffic.**
9. **Informational Brochures and Promotional Measures** - Work with the Convention and Visitor's Bureau to improve pedestrian, transit, and parking informational brochures for visitors and enhance awareness of Chinatown attractions. **Waterfront Transportation Projects Office**
10. **Enforcement of Merchant Sidewalk Encroachment Violations** - Presently merchants are allowed a 2 foot encroachment from the property line, through the DPW permit process, into the sidewalk for display of merchandise. The 2 foot encroachment may be violated or merchandise may be stored on the sidewalk. Enforcement should be given a high priority- to ensure pedestrian flows are accommodated to the greatest extent possible. Also truck vendors sell merchandise from their vehicles, this activity is subject to police vendor permit and should be enforced. **Department of Public Works and Police Department**
11. **Better coordination of transit runs and schedules** - Request that MUNI provide better supervision of this activity. **Public Transportation Commission**

1997 and 1998 Improvement Program

The following measures are implementable on a slightly longer time frame as they must be programmed in capital improvement and/or operational programs. The goal is to complete these projects by the end of the 1998 calendar year. It is proposed that the Public Transportation Department and the Department of Parking and Traffic do any additional evaluation that is required, review with the community and their Commission and other transit agencies, as required, prior to implementation.

1. **Destination Guide Signs** - Upon the opening of the King Street ramps to I-280 in 1997, add signs on U.S. 101 directing Chinatown, North Beach, and Fisherman's Wharf traffic to use I-280 and King Street. Also sign King Street and The Embarcadero. **Department of Parking and Traffic with Caltrans**
2. **Northeast Quadrant Transportation Study** - Undertake a comprehensive study of northeast San Francisco to evaluate circulation issues and traffic and transit flows for downtown, Civic Center, Chinatown, North Beach, Fisherman's Wharf, and the waterfront. This study should look at directional changes for Clay, Washington, and adjacent streets, the addition of bus only lanes, and the feasibility of providing remote staging areas for delivery vehicles. Work with the Transportation Authority to further define scope and identify funding. **Waterfront Transportation Projects with the Transportation Authority, Department of Parking and Traffic, and the Planning Department.**
3. **Bus Islands and Bulbs** - Evaluate the potential for adding bus islands and bulbs to

facilitate bus loading and unloading as part of the Northeast Quadrant Transportation Study. **Public Transportation Commission and Department of Parking and Traffic.**

4. **Provide articulated buses on MUNI Route #33** - Deploy articulated buses on the #30 in FY 1998/99. The bus purchase is already included in the MUNI capital program. **Public Transportation Commission**
5. **Samtrans Weekend Service** - Request SamTrans to institute weekend service on their 47F, 48F, and 49F routes to Chinatown. **SamTrans**
6. **Pursue the Seismic Upgrade Project for the St. Mary's Garage** - The seismic upgrade project proposes to reconfigure garage layout to permit self-park and add an elevator allowing direct access to St. Mary's and easing pedestrian access to Chinatown. This capital project is an 18 month project scheduled for completion at the end of 1997. Upon completion a reduction in parking rates for weekend and week nights will be proposed and the need for shuttle service to Chinatown will be evaluated. **Department of Parking and Traffic and Department of Public Works**
7. **Support Construction of a New Vallejo Street Garage** - The Parking Authority will be introducing new plans for the Vallejo Street Garage which stay within the existing height limit in 1996. If necessary approvals are received and design is completed in 1996, construction could be concluded by the end of 1998. **Department of Parking and Traffic**
8. **Fifth and Mission Garage Signing** - Implement informational signing within the garage to direct pedestrians to the transit routes to Chinatown. **Department of Parking and Traffic and Public Transportation Department**
9. **Short-term transit improvements on the #38 Geary and #9X San Bruno** - Evaluate express and frequent MUNI service directly from the Sunset and Richmond via the #38 Geary line by rerouting some runs to Washington Square instead of the Transbay Terminal. Evaluate extending #9X service to weekends. MUNI will try to evaluate these proposals in FY 96/97, acknowledging that their current highest priority is restoration of service reliability systemwide. **Public Transportation Commission**

MID-EMBARCADERO/TERMINAL SEPARATOR STRUCTURE IMPROVEMENT PROGRAM

1999 Completion Date

The following measures would be implemented as part of the Md-Embarcadero/Terminal Separator Structure Project which is scheduled for completion in 1999.

1. **Destination Guide Signs** - Modify Bay Bridge signing to promote left and right exits from the Bridge and travel via Folsom Street to Chinatown, North Beach, and Fisherman's Wharf. **Department of Parking and Traffic with Caltrans**

2. **Signalization of the Broadway/Front and Broadway/Davis intersections** - Signalization of the only remaining unsignalized intersections on Broadway, east of the tunnel, will facilitate traffic flows. Traffic has increased 40 percent since the removal of the freeway, the Broadway/Front intersection rates in the top 10 locations for signal improvements in the city. **Department of Parking and Traffic**
3. **Variable Message Sign for Parking Access Routes** - Locate variable message sign south of Portsmouth Square Garage and on The Embarcadero at Washington Street to notify patrons when the Portsmouth Square Garage is full. **Department of Parking and Traffic**
4. **Extend MUNI Route #83 to The Embarcadero** - The Public Transportation Commission will review this proposal in conjunction with the initiation of F-Market line service along The Embarcadero. **Public Transportation Commission**
5. **The Embarcadero/Washington Street Intersection** - Provide two left turns lanes, from northbound Embarcadero to Washington Street and configure the intersection with the appropriate rail and roadway alignments and profiles to facilitate future construction of surface rail service. **Public Transportation Department and Department of Public Works**
6. **Reserve Adequate Right-of-Way for Future Surface Rail Service on Washington Street** - A portion of Block 203 will be rededicated to public right-of-way to preserve this option. **Department of Public Works.**
7. **Exclusive transit lane for MUNI Route #15** - Provide a viable transit lane for the #15 to avoid the worst congestion spots, for example a transit-only contra-flow lane on Sansome Street. **Public Transportation Commission and Department of Parking and Traffic.**

LONG RANGE IMPROVEMENT PROGRAM

There are several rail transit proposals that were evaluated for providing future service to Chinatown as an extension of Bayshore or F-Market line service. The Bayshore connection to Chinatown is recommended as a higher priority project than the F-Market line connection to Chinatown as it potentially serves a broader ridership market. The actions recommended to further the rail options are noted below. Full funding has yet to be identified for study or construction of these projects.

1. **Bayshore Corridor Rail** - As part of the Bayshore Corridor EIR pursue the extension of service into Chinatown via the Third Street/Bayshore Corridor, across Market and under Stockton or Kearny Streets via a Central Subway Tunnel. Chinatown advocates consideration of an extension of the terminal point for this route closer to Broadway. Analyze a surface rail connection to Chinatown from The Embarcadero on a Washington/Kearny/Jackson/ Columbus/Washington Street loop as a fallback option in

case full funding is not available to construct the subway option. **Public Transportation Department with the Transportation Authority**

2. **F- Market Line to Chinatown** - Should an F-Market line rail connection to Chinatown be pursued in the future, the preliminary analysis indicates the Washington/Kearny/Jackson/Columbus/Washington Street loop as the most desirable route. The most viable alternatives should, however, receive further evaluation before any decisions are made. **Public Transportation Department and Transportation Authority**
3. **Cable Car Service Expansion** - Further evaluate the potential for the provision of a new "California-Hyde" cable car service. This new route would serve as an additional route to Fisherman's Wharf, increasing service by 50 percent and to Chinatown via the Powell-Mason line by 33 percent. **Public Transportation Department**
4. **Interim Parking Facility** - Chinatown would like to see additional consideration of a remote parking facility in the Northeast sector of the city if warranted in the future. Initial emphasis will be given to available capacity within the Chinatown and adjacent area (including the proposed new Port garage in the Clay/Washington corridor.) **Department of Parking and Traffic**

1. INTRODUCTION

This report presents the results of a transportation evaluation conducted for the *Alternatives to Replacement of The Embarcadero Freeway and the Terminal Separator Structure* to evaluate transportation-related issues concerning the Chinatown Area. This report contains a description of pre-earthquake, existing (1992/1993) and anticipated year 2015 transportation conditions in downtown as they relate to Chinatown, transportation issues that have been raised by the Chinatown community, as well as an evaluation and description of measures for improved access to the Chinatown Area.

1.1 BACKGROUND

On October 17, 1989 the Loma Prieta earthquake rendered the Embarcadero Freeway (SR-480) and the Terminal Separator Structure inoperable. Their closure gave the City an opportunity to evaluate their role in serving both the downtown street network and the I-80/U.S. 101 connections. As a result, in 1990, the San Francisco Board of Supervisors passed a resolution endorsing the demolition of the Embarcadero Freeway and calling for the evaluation of alternatives to an elevated structure.

The *EIS/EIR for the Alternatives to the Replacement of the Embarcadero Freeway and the Terminal Separator Structure* was initiated in 1991 to evaluate alternative improvements. Alternatives analyzed as part of the environmental process include a No Build alternative, and four Build alternatives. The Draft EIS/EIR for the study was circulated for public review on August 25, 1995 and the public comment period extended to October 16, 1995.

1.2 PURPOSE OF THE STUDY

As part of the public review process of the Draft EIR/EIS for the Mid Embarcadero DEIS/EIR, a number of comments and concerns were raised regarding the loss of access to Chinatown following the removal of the Embarcadero Freeway. To address these concerns, the Waterfront Transportation Projects Office established a process to hear the comments and concerns of the Chinatown community, evaluate in more detail traffic conditions in the Chinatown area and propose recommendations for improved access. This study presents the results of the public participation process and recommendations for traffic, transit, parking and pedestrian conditions.

1.3 ORGANIZATION OF THE REPORT

This report is organized into seven sections. The first three sections present the background on the TSS/Mid Embarcadero project, and transportation conditions/travel patterns for pre-earthquake, existing and future year 2015 conditions and how they relate to the Chinatown area. This is followed by a discussion of the traffic, transit, parking/goods movement and pedestrian issues and potential solutions. A summary of the recommendations is presented in the final section.

2. IMPLICATION OF 1989 EARTHQUAKE AND TSS/MID EMBARCADERO PROJECT

The October 1989 Loma Prieta earthquake closed many freeway sections and freeway ramps that affected accessibility to and from San Francisco, particular the northeast quadrant of the City, the area generally north of Bryant Street and east of Van Ness Avenue. Before the earthquake, the northeast quadrant of San Francisco was served by a network of freeway ramps that provided multiple access points to and from the regional freeway system.

In the vicinity of Chinatown, the Broadway ramps at Sansome and Battery and the ramps to Washington and from Clay provided access to I-80 via the Embarcadero Freeway and the Terminal Separator Structure for travel to the East Bay and to the San Francisco Peninsula. Chinatown, North Beach, Fisherman's Wharf, and other areas north of the downtown core primarily relied on those ramps for access to the freeway system.

These freeway ramps provided well-defined paths on arterial streets (Broadway, Columbus, Washington, Clay, etc.) to go to and from the freeway system using different approach routes, with little overlapping use of each ramp and minimal dispersion of traffic onto alternate routes through adjacent neighborhoods. However, during peak traffic periods, which in many instances existed for large portions of both weekdays and weekends, the ramps also represented a focus for congestion in the vicinity of the points of contact between the freeway ramps and the local street network, because of differences between the capacities of the local streets and the capacity of the mainline I-80 freeway to absorb traffic. As a result, traffic unable to merge into the I-80 mainline freeway regularly queued on the Embarcadero Freeway that functioned as an elevated parking lot.

The closure of the Embarcadero Freeway because of the earthquake eliminated the Broadway ramps and the Washington/Clay ramps reducing congestion at those locations but affecting local traffic by dispersing regional traffic onto local streets. The absence of freeway ramps close to Chinatown, North Beach and Fisherman's Wharf intensified the use of the remaining freeway ramps south of Market Street and those street corridors leading to and from them: Battery St./ First St., Bush St., Montgomery St., Stockton St./Fourth St., Fremont St./Sansome St., Third St./Kearny St., and The Embarcadero. The Embarcadero has been providing north and southbound access for freeway traffic, carrying mostly traffic to and from the northeast quadrant, while the Fremont St./Sansome St. and First St./Battery St. corridors serve traffic to and from the Bay Bridge. The Third St./Kearny St. corridor carries traffic northbound from south of Market Street into Chinatown and North Beach, while the Stockton St./Fourth St. corridor provides direct connection to westbound I-80 and southbound U.S. 101 from the north of Market Street area. The absence of well-defined routes to and from the freeways has created some confusion about access to Chinatown, North Beach and Fisherman's Wharf, especially among visitors.

The current EIR/EIS, *Alternatives to Replacement of the Embarcadero Freeway and the Terminal Separator Structure*, presents and analyses the proposed project alternatives under consideration, whose purpose is fourfold:

- 1 Restore local and regional transportation connectivity affected by the 1989 Loma Prieta Earthquake and the loss of the Embarcadero Freeway and the TSS;
- 2 Provide ramp capacity without building the amount of elevated structures formerly occupied by the Embarcadero Freeway and the TSS, taking advantage of surface streets and transit to accommodate travel demand;
- 3 Enhance the integration of different modes of transportation in the project area including automobiles, ferries, buses, light rail, trucks, pedestrians and bicycles; and
- 4 Improve the appearance of the project area, maximize physical and visual access to the waterfront and minimize physical intrusion into commercial and residential areas of San Francisco, pursuant to long-standing goals and urban design concepts of the Northeastern Waterfront Area Plan, and element of the San Francisco Master Plan.

Five project alternatives are under consideration and are being analyzed as part of the environmental process at an equal level of detail. They include a "No Build" alternative and four "Build" alternatives. Two of the "Build" alternatives include variations in the proposed treatment of the I-80 eastbound off-ramp and westbound on-ramp to and from the Peninsula. On January 29, 1996 the San Francisco Board of Supervisors selected one of the build alternatives (the DPT variant alternative) as the preferred project alternative.

The Preferred Alternative would realign and upgrade the existing surface roadway along The Embarcadero between Folsom Street and Broadway, providing three continuous traffic lanes in each direction during the AM and PM peak periods, with the curb lanes providing parking in off-peak periods. The planned MUNI F-Market line would be accommodated in the roadway median. Across from the Ferry Building, the northbound roadway would follow the existing straight alignment, while the southbound roadway would diverge from the northbound lanes to curve westward, creating a plaza area between the northbound and southbound lanes.

This alternative will modify the existing Fremont Street off-ramp from I-80 westbound to allow traffic direct access to Folsom Street. It would also provide additional off-ramp capacity from I-80 eastbound by widening the freeway's approach to the existing Fourth Street off-ramp. When warranted by congestion levels in the future, the current PM peak-period carpool lanes on the Bryant Street approaches to the Sterling Place on-ramp would be converted to mixed-flow operation, while shifting the PM peak-period carpool restriction to the Essex Street approach to the Bay Bridge (I-80 eastbound). Essex Street would remain a two-way street.

The Preferred Alternative would also implement a package of operational and surface street traffic improvements to facilitate traffic flow in downtown and access to and from the freeway. These improvements would include the following:

- Washington Street would be restriped between Drumm Street and The Embarcadero to provide two travel lanes in each direction (as opposed to one wide lane in each direction

currently). Between Davis and Drumm Street, Washington Street would be restriped to provide two westbound travel lanes. Washington Street would be realigned to intersect The Embarcadero directly across from Pier One.

- A second exclusive left-turn lane would be provided on northbound Embarcadero at Washington Street.
- A new left-turn pocket would be provided on northbound Drumm Street at Washington Street.
- Drumm Street would be restriped north of Washington Street for two northbound lanes (as opposed to one wide lane currently).
- Davis Street between Clay and Washington Streets would be reopened to vehicular traffic. The approaches of Davis Street to Clay Street and to Washington Street would be controlled by a STOP sign.
- The eastbound approach of Bryant Street would be widened between Main Street and The Embarcadero to incorporate two left-turn-only lanes and a transit lane with right turns allowed. (Bryant Street currently provides two eastbound lanes at this location.)
- The eastbound approach of Folsom Street at Second Street would be restriped to provide an exclusive left-turn lane, four through lanes, and an exclusive right-turn lane. (Folsom Street currently provides four lanes at this location.)
- Fremont Street would be restriped to include an additional mixed-flow through lane from the I-80 westbound off-ramp at Harrison Street to and across Market Street. (Fremont Street currently has four mixed-flow lanes from Howard to Mission Streets and two mixed-flow lanes and a transit-only lane from Mission to Market Streets.) The current two-way segment between Folsom and Harrison Streets would remain two-way operation. At Mission Street, there would be three through lanes, one left-turn-only lane and one right-turn-only (transit excepted) lane. At Market Street, there would be a left curb transit-only lane, a transit island, and three through lanes. The left-most through lane pavement includes the F-Market line transit tracks.
- Front Street between Market Street and Pine Street would be restriped to four lanes: two left-turn-only and two through lanes. (Front Street currently has two wide lanes.)
- An additional mixed-flow through lane would be provided on Bush Street during the PM peak period between Montgomery Street and Battery Street by removing parking on the right side (the extra lane is already provided during the AM peak).
- First Street would be restriped between Market Street and Howard Street to provide an additional mixed-flow through lane and a right-curb transit lane during AM and PM peak

hours. The existing left-side transit lane would remain as an all-day transit lane, but with alternate positions between peak and off-peak hours. During peak hours, the left-side transit lane would be against the east curb as a tow-away lane; during off-peak hours it would be in the first travel lane allowing metered loading or parking along the east curb. There would be overhead electronic signs to indicate the position of the left-side transit lane during different time periods of the day. The right-side transit lane would be in the towaway lane against the west curb during peak hours only.

- First Street would be restriped between Howard and Harrison Streets to provide a new peak-hour only left-side transit lane against the east curb. Left-turns from First Street onto Harrison Street would be allowed in this transit lane during peak hours.
- The northbound approach of Third Street at Market Street would be restriped to provide five continuous lanes across the intersection (one shared left-through lane, three through lanes, and one shared through-right lane). The northbound section of Kearny Street between Market Street and Geary Street would be restriped to five lanes (two left-turn-only lanes and three through lanes). Third Street currently provides four continuous lanes across Market Street to Geary Street.
- The southbound approach of Fourth Street at Harrison Street would be restriped to provide an additional exclusive lane onto the I-80 freeway (two through lanes, two diagonal lanes for exclusive freeway access, and a right-turn-only lane).
- MUNI staff and the San Francisco Public Transportation commission would consider extending the route of MUNI's 83-Pacific bus from its current eastern terminus at Battery Street to The Embarcadero, in order to allow transfers to the planned MUNI F-Market line.
- A two-phase traffic signal system upgrade would optimize signal timing along Broadway, Stockton Street, and Grant Avenue. Consideration would be given to integrating four existing traffic signal systems: North of Market, Grant Avenue, Stockton Street, and Columbus/Broadway.
- The intersections of Bryant/Main, Bryant/Beale, Broadway/Front and Broadway/Davis would be signalized to facilitate traffic flow.

Some of the improvements listed above would be implemented immediately, and some would be phased-in over time, when warranted by congestion levels.

3. TRAVEL PATTERNS AND TRAFFIC CONDITIONS FOR PRE-EARTHQUAKE, EXISTING AND YEAR 2015 CONDITIONS

This section presents an overview of changes in transportation conditions and travel patterns between the 1989 Loma Prieta earthquake and existing conditions, and the anticipated year 2015 conditions under the No Build conditions and two TSS/Mid Embarcadero alternatives.

3.1 TRAFFIC VOLUMES

Following the 1989 Loma Prieta earthquake, access to the Chinatown area was affected by the closure and removal of the Embarcadero Freeway and its connecting ramps to the Bay Bridge and I-80/U.S.101. Traffic volumes using the Freeway were redistributed to available ramps and local City streets. In addition, the closure of I-280 for earthquake retrofit resulted in an increase in traffic on I-80/U.S. 101 and on ramps serving downtown San Francisco.

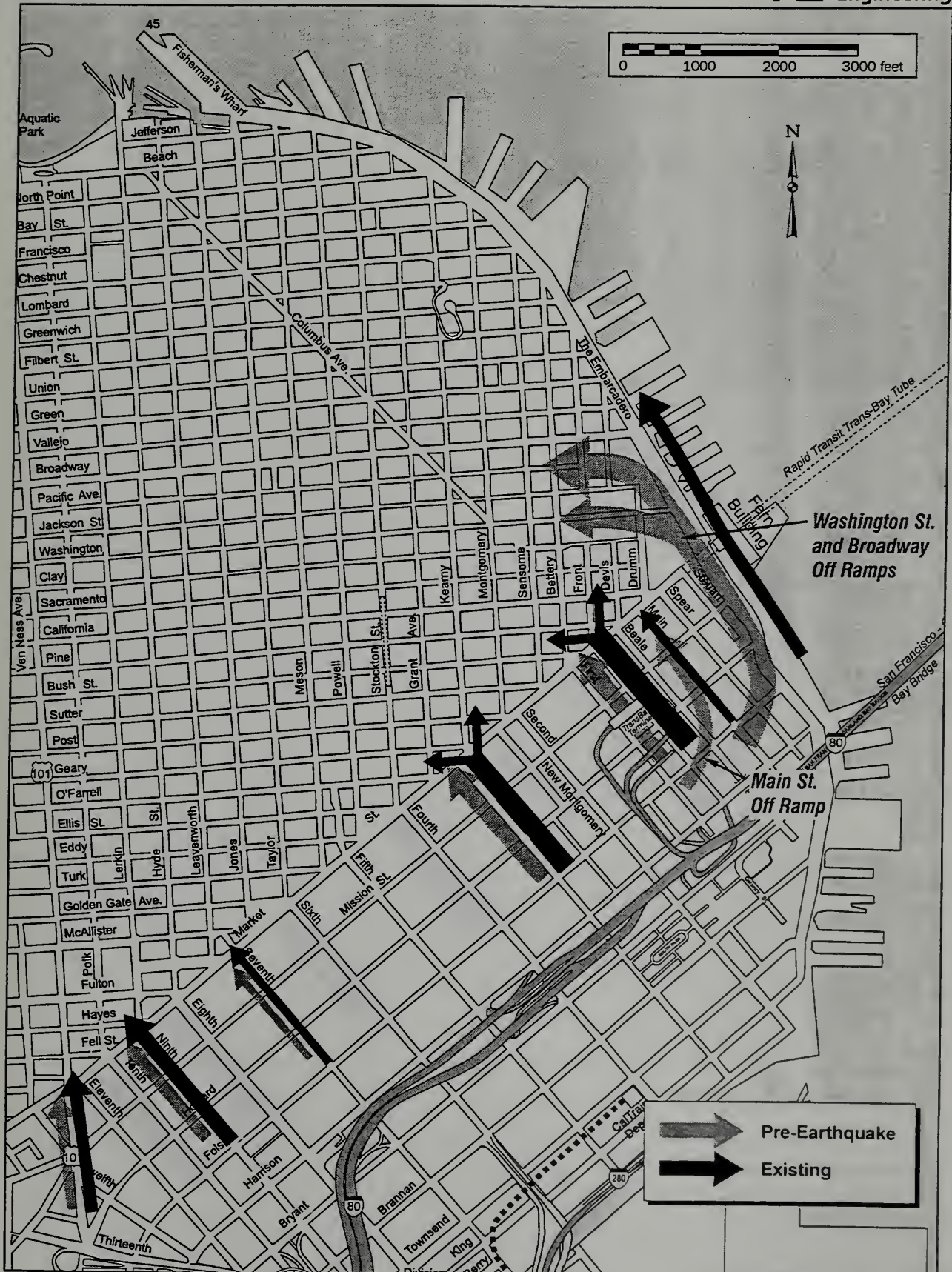
Vehicles destined to and from the East Bay and using the Main/Beale, Broadway and Washington/Clay ramps under pre-earthquake conditions now, use the two Fremont Street off-ramps from the Bay Bridge, and the on-ramps at First Street, Essex Street and Sterling Place. Vehicles destined to and from the Peninsula and southwest San Francisco using the Embarcadero Freeway ramps and I-280 under pre-earthquake conditions, now use the Fourth Street ramps. With the progress on the earthquake retrofit on I-280, I-280 has recently become more available to Peninsula and southwest San Francisco traffic.

As a result of these changes in freeway access, the access to downtown and the Chinatown area has been affected. The Embarcadero Freeway, while not depositing vehicles within the heart of Chinatown, did facilitate access to Chinatown by eliminating the need to traverse local streets.

The need to use local streets to access the Chinatown area has generally meant increased travel time and greater confusion for visitors. Following the closure of the Embarcadero Freeway, the City of San Francisco, in cooperation with Caltrans, undertook a signing effort to clarify various access routes to Chinatown, North Beach and Fisherman's Wharf in 1990. Other improvements such as signal installations and signal timing changes, also have been implemented to improve traffic flow into downtown as well as the northeast quadrant of San Francisco.

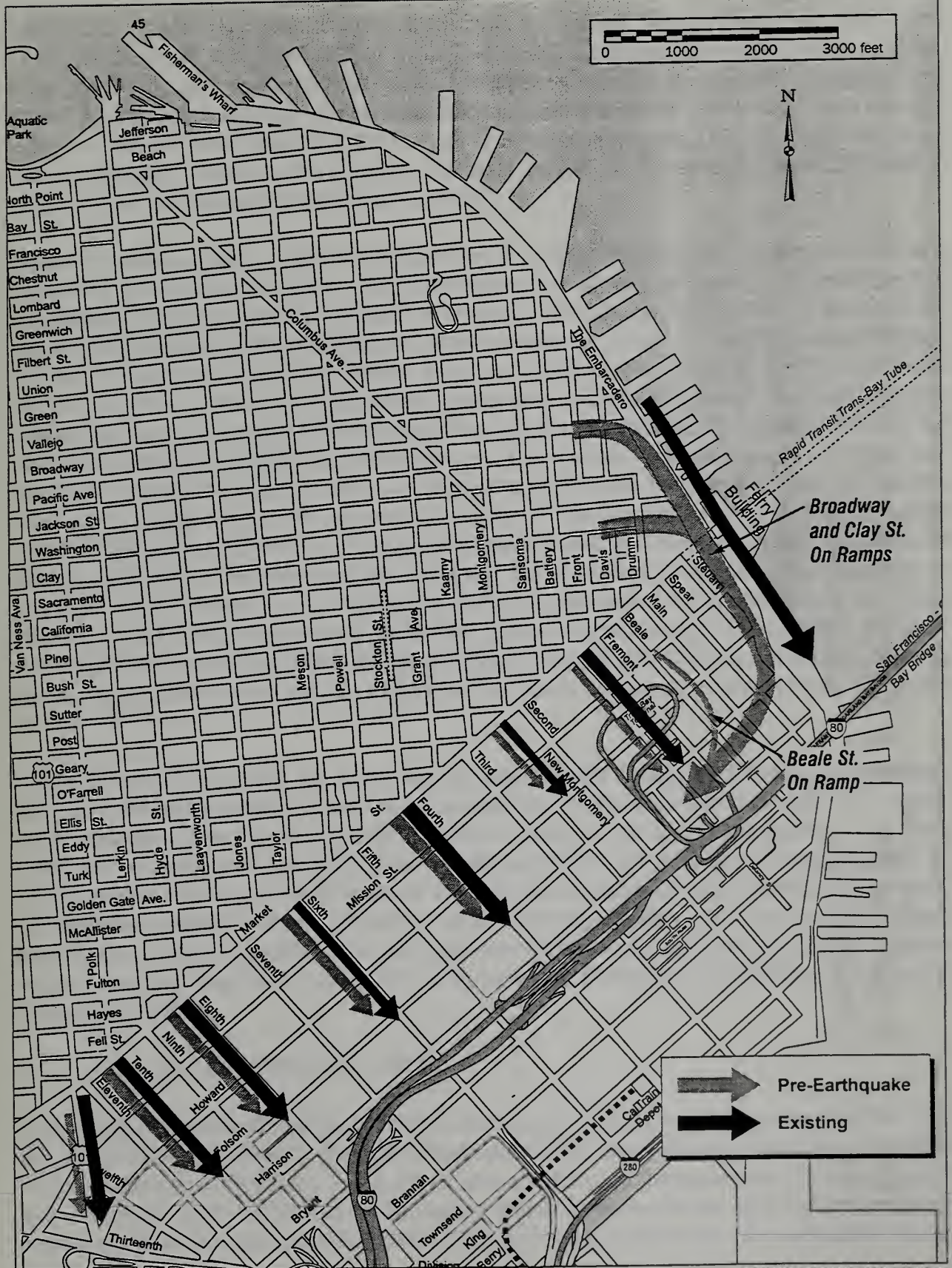
As noted above, traffic shifted from the Embarcadero Freeway and roads accessing the on- and off-ramps to the local streets. Comparison of traffic volumes along the cordon into downtown between 1983 and post-earthquake conditions has revealed that a similar amount of vehicles still access downtown San Francisco, however, the access routes have changed.

Figures 1 and 2 present a summary representation of changes in traffic volumes between pre-earthquake and existing conditions for the AM and PM peak hours, respectively. During the AM peak hour, the peak direction of traffic flow is inbound and the number of vehicles on The Embarcadero roadway, Fremont Street and Third Street has increased from pre-earthquake



CHINATOWN AREA STUDY

Figure 1
INBOUND TRAFFIC - AM PEAK



CHINATOWN AREA STUDY

Figure 2
OUTBOUND TRAFFIC - PM PEAK

conditions. These three streets currently serve as the primary access routes into Chinatown. During the PM peak, the peak direction in outbound to the Bay Bridge and I-80/U.S.101 on-ramps. As shown on Figure 2, traffic volumes increased substantially on The Embarcadero roadway, First Street, Fourth Street and Eight Street. It should be noted that during both the AM peak inbound and PM peak outbound directions, the number of vehicles utilizing the U.S.101 South Van Ness ramps increased. Similarly, the number of vehicles using Hyde Street to access Eight Street to U.S. 101/I-80 increased during the peak periods.

Figure 3 provides a more detailed comparison of the pre-earthquake and existing volumes at a screenline surrounding Chinatown and downtown north of Market Street. A screenline is a hypothetical line that would be crossed by vehicles, and are generally used to describe the magnitude of travel and changes between various conditions/scenarios. Due to limited information for the AM peak hour at the screenline locations, Figure 3 presents only the PM peak hour conditions. The volumes indicated reflect the increase in traffic accessing Chinatown via local streets (the volumes crossing Market Street have increased considerably). Correspondingly, the number of vehicles accessing North of Market from the waterfront via Washington and Broadway has decreased substantially due to the removal of the Washington and Broadway ramps. This has resulted in a reduction in the number of vehicles on the streets accessing ramps, namely Broadway, Washington and Clay. It should be noted that west of Chinatown, eastbound traffic on Broadway during the AM peak hour has increased due to additional motorists using Broadway to commute into downtown, while westbound traffic has decreased by approximately the same amount. Figure 3 also indicates that traffic from east/west streets east of Powell and north/south streets north of Pacific Avenue has decreased slightly, due partially to the removal of the freeway ramps. Traffic volumes on Hyde Street south of Turk Street increased by approximately 200 to 400 vehicles per hour.

Traffic volume comparisons conducted by the Department of Parking and Traffic were reviewed and supplemented by additional volume comparisons at intersections within Chinatown. Overall, traffic volumes at intersections within Chinatown have not changed substantially. The most substantial increase has been on Stockton Street southbound, with increases of approximately 50 to 100 vehicles per hour at Pacific Avenue, 200 vehicles at Sacramento Street and approximately 250 vehicles at Market Street. However, traffic operating conditions in Chinatown have been affected by localized congestion (due to a large extent to double parking) and congestion at Union Square and the downtown core which spills back into Chinatown on Stockton, Kearny and Montgomery Streets.

3.2 TRAVEL PATHS/TRAVEL TIMES

To evaluate the relative difference in travel times between existing and future year 2015 No Build and two of the four TSS/Mid Embarcadero Build alternatives, average travel times were estimated for travel paths to Chinatown. Travel times were estimated for representative routes using the output from the TRAF-NETSIM micro-simulation model developed for the TSS/Mid Embarcadero project, and from field surveys of the portion of the path not included in the micro-simulation model.

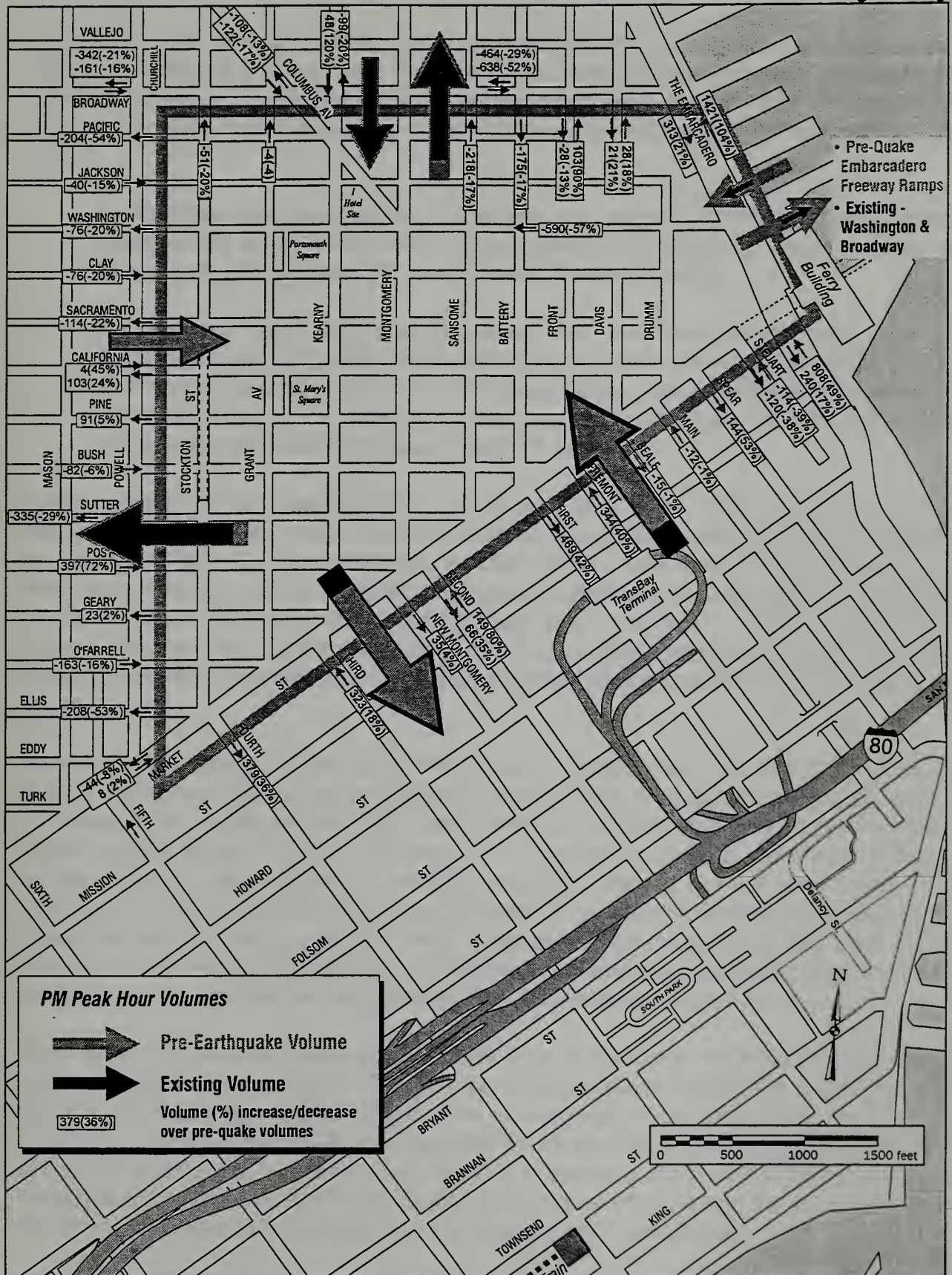


Figure 3
PRE-EARTHQUAKE vs. EXISTING TRAFFIC VOLUMES
at Downtown / Chinatown Area Screenlines

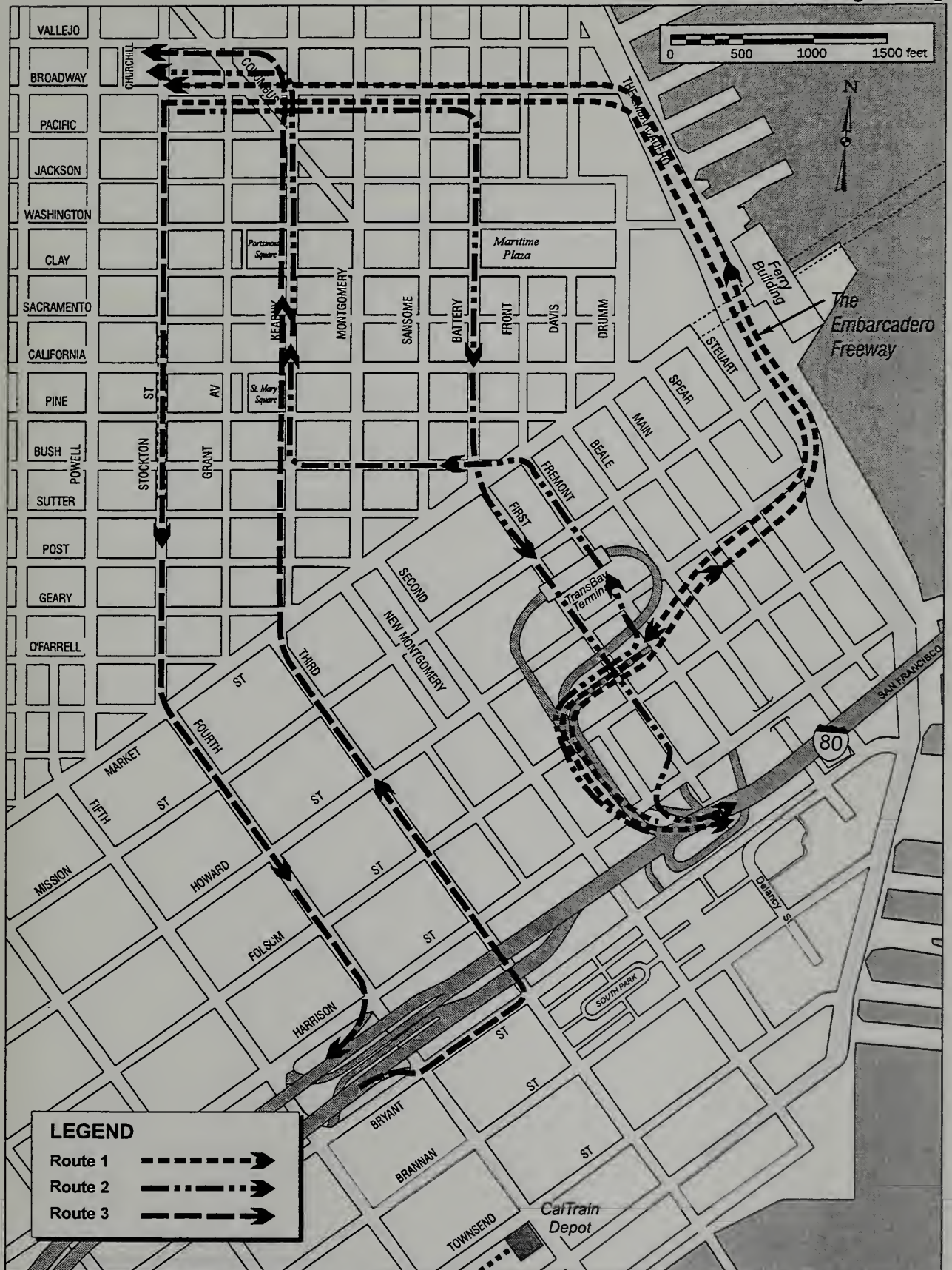
Four travel routes were selected for purposes of comparison. These routes are presented on Figures 4 through 6 and represent common/typical paths that would be used to access the common intersection of Broadway and Stockton from the I-80/U.S. 101 and I-280. The travel times include the portion of the trip that would occur on the freeway, on the ramp system and on the local streets.

- For East Bay traffic, two travel paths were selected: the first path utilizes Howard (Folsom under the two Build Alternatives), The Embarcadero and Broadway (Route 1), while the second path utilizes Fremont/Pine and Kearny Streets (Route 2).
- For Peninsula and south San Francisco traffic the Fourth Street ramps and the Third/Kearny and Stockton/Fourth Street corridors are the primary access routes (Route 3). With the completion of the I-280 King Street ramps, I-280 would become an attractive alternative to this route. Travel times were estimated for this future route including I-280, The Embarcadero and Washington Street (Route 4).

Table 1 presents the average AM and PM peak hour travel times for the four routes through downtown and Chinatown. Travel times are presented for pre-earthquake and existing conditions, for future year 2015 No Build conditions, for the Preferred Alternative and for Alternative 3B. Alternative 3B is similar to the Preferred Alternative, except that it also includes the construction of a Second Street on-ramp to U.S. 101 southbound at Harrison Street. The construction of the Second Street on-ramp as a lane-add onto U.S. 101 southbound requires the Fourth Street on-ramp to be modified to a merge with the freeway mainline (rather than a lane-add as under existing conditions).

Under existing conditions, comparison of the two routes (Routes 1 and 2) to Chinatown from I-80 westbound/the Bay Bridge indicate similar travel times during both the AM and PM peak hours, for both inbound and outbound directions. Travel times to the Peninsula (Route 3) are somewhat longer, and are longest during the PM peak hour. Pre-earthquake travel times were generally slightly shorter, by approximately 2 minutes, during both the AM and PM peak hours. The exception is Route 2 conditions during the PM peak hour, where travel times were one minute longer than under existing conditions. This difference is due to congestion at the merge to I-80 eastbound. The merge configuration of the First Street on-ramp under pre-earthquake conditions was a lane merge with I-80 eastbound traffic, while this merge is currently a lane-add.

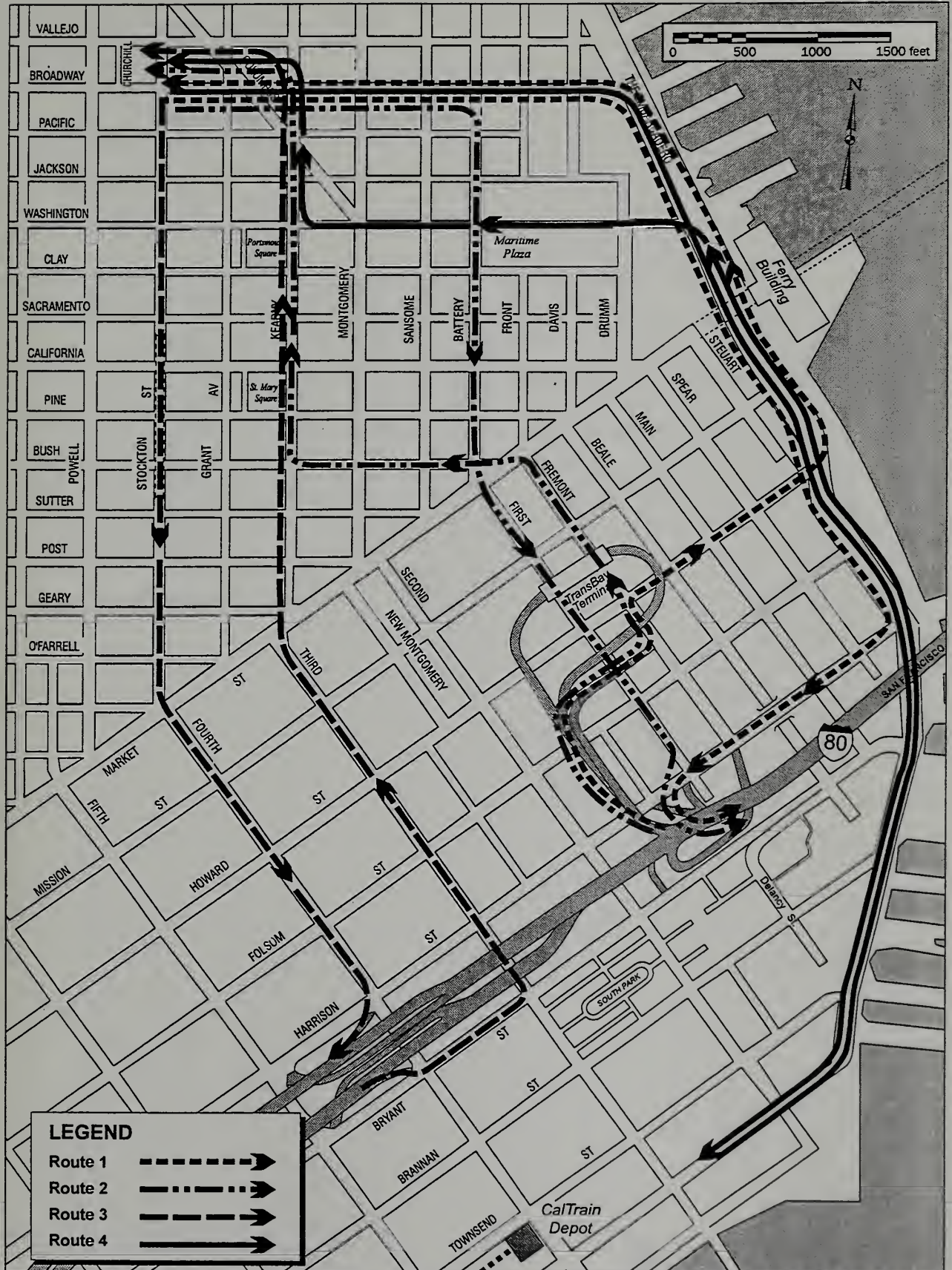
Under future year 2015 No Build conditions, travel times on the routes are anticipated to increase marginally over existing conditions. For both the Preferred Alternative and Alternative 3B, travel times for all routes would either be the same or marginally shorter than under the No Build conditions. Under Alternative 3B, which includes the construction of the Second Street on-ramp to U.S.101 southbound, the travel route (Route 3) to this ramp would include Battery and First Street, rather than Stockton and Fourth Street, and during the PM peak hour the travel times from the Chinatown area would be shorter than via Stockton and Fourth Streets.



CHINATOWN AREA STUDY

Figure 4

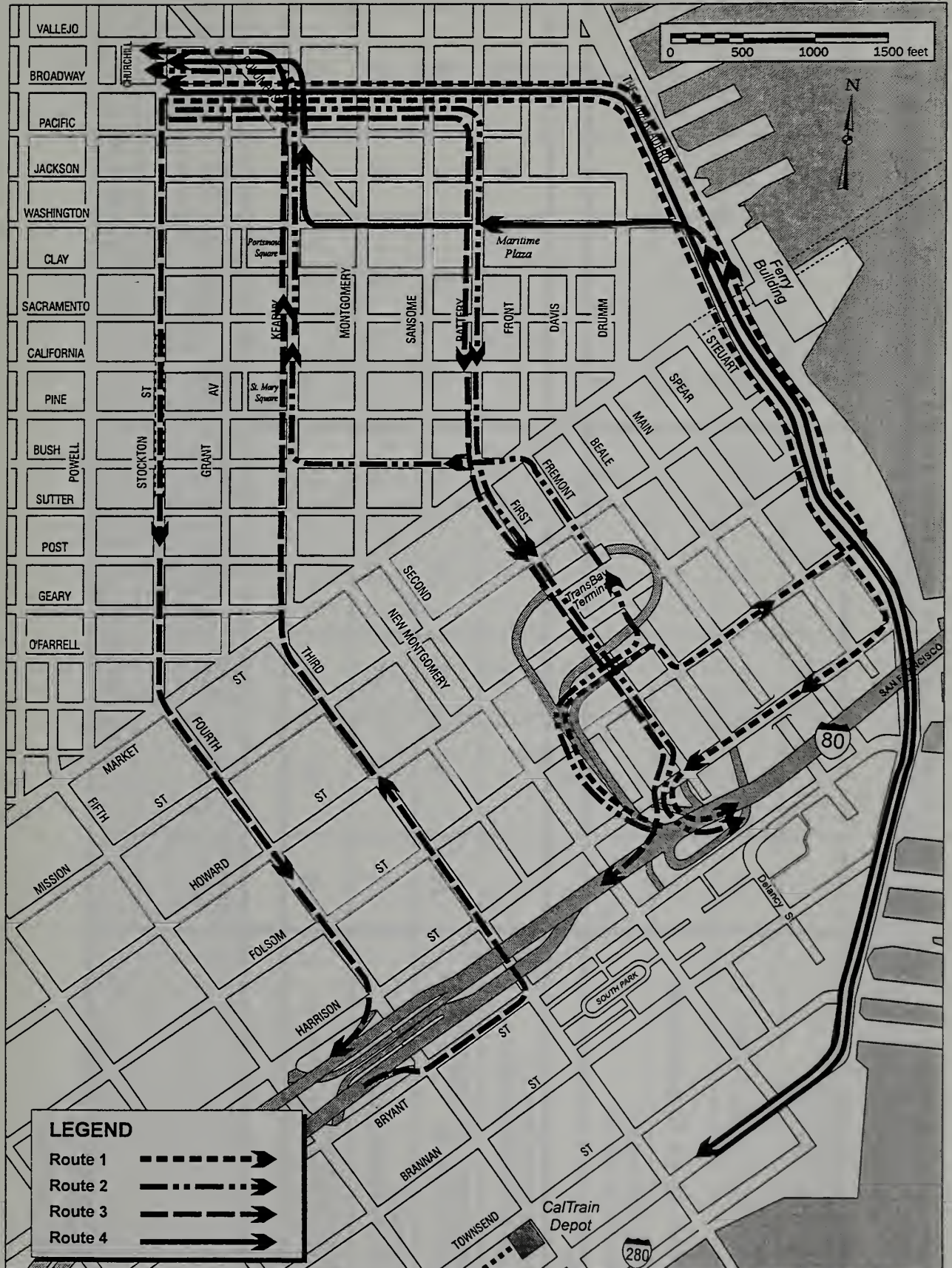
**TRAVEL PATHS
PRE-EARTHQUAKE CONDITIONS**



CHINATOWN AREA STUDY

Figure 5

**TRAVEL PATHS
EXISTING / NO BUILD CONDITIONS**



CHINATOWN AREA STUDY

Figure 6

TRAVEL PATHS

ALT. 3B AND PREFERRED CONDITIONS

Table 1
Travel Times (Minutes)
AM and PM Peak Hour

Route	AM PEAK HOUR					PM PEAK HOUR				
	Pre- Quake	Existing	Year 2015			Pre- Quake	Existing	Year 2015		
			No Build	Preferred Alt.	Alt. 3B			No Build	Preferred Alt.	Alt. 3B
Inbound										
1 I-80 WB to Broadway/ Stockton via Embarcadero/Broadway	10	12	13	13	12	13	15	17	16	18
2 I-80 WB to Broadway/Stockton via Fremont/Kearny	12	12	12	11	11	14	15	15	14	15
3 I-80 EB/U.S.101 NB to Broadway/Stockton via 3rd/Kearny	16	18	19	18	18	25	27	27	26	26
4 I-280 NB to Broadway/Stockton via Embarcadero/Washington (1)	--	--	15	15	15	--	--	15	15	15
Outbound										
1 Broadway to I-80 EB via Broadway/Embarcadero	5	7	8	8	8	6	8	9	9	9
2 Broadway to I-80 EB via Battery/First Street	7	7	9	7	8	10	9	9	9	9
3 Broadway to I-80/U.S 101 SB via Stockton/4th (2)	11	12	12	12	16(1 2)	17	18	22	22	23(15)
4 Broadway to I-280 SB via Broadway/Embarcadero (1)	--	--	13	13	13	--	--	15	15	15

Notes:

(1) Route 4 evaluated only for future year 2015 conditions

(2) Under Alternative 3B, a 2nd Street on-ramp connection to I-80/U.S. 101 southbound is proposed. Travel times in parentheses represent an alternative route from Chinatown to the South Bay via Broadway, Battery, First, Harrison to the 2nd Street on-ramp.

With the completion of the I-280 King Street ramps, I-280 would become an attractive route to access the Peninsula and southern San Francisco. It would provide an alternative to the use of the U.S. 101/I-80, the Fourth Street ramps and Stockton and Kearny Streets (Route 3), and travel times would be shorter than Route 3 during both the AM and PM peak hours.

3.3 INTERSECTION OPERATING CONDITIONS

Table 2 presents the vehicle delay and levels of service (LOS) for several key intersections in the study area during the weekday AM and PM peak hours for pre-earthquake, baseline and future 2015 scenarios (See Figure 7 for location of intersections). The results indicate that future traffic congestion would generally occur at the same locations as it occurs today, but with longer delays and sometimes higher (worse) LOS. Most of the intersections shown in Table 2 would not change LOS substantially between pre-earthquake, baseline and any of the three future alternatives, with some exceptions commented below.

Under pre-earthquake conditions, localized congestion higher than under baseline or future conditions occurred at those locations providing access to and from the Embarcadero Freeway, such as along Broadway and Washington Street. Under baseline and future conditions higher than pre-earthquake traffic congestion would occur along Broadway, Kearny Street, Montgomery Street, Third Street, Fourth Street and The Embarcadero, major streets leading to or from the I-80 freeway. Generally, traffic congestion at most of the intersections analyzed in this study would operate at acceptable levels of service (level of service D or better) under existing and future conditions. Intersections operating at or close to unacceptable LOS would be Third/Market Streets during the AM peak hour under Alternative 1 (No Build), and the intersections of Stockton/Clay Streets and The Embarcadero/Broadway during the PM peak hour under the Fourth Street Option of Alternative Three (Alternative 3B). During the PM peak hour, the intersection of Powell Street/Broadway currently operates at LOS C, and would operate at LOS D under future conditions. Before the Loma Prieta earthquake the intersections of Stockton St./Broadway and Kearny St./Broadway operated at or close to unacceptable LOS during the PM peak hour.

It is important to note, however, that the levels of service and vehicle delays at key City locations shown in Table 2 represent average values over the course of the AM or PM peak hour, the highest hour of the peak period. It is possible that some intersections may experience relatively brief surges of traffic congestion due to fluctuations in traffic flow over the course of the one hour period being analyzed. Under those circumstances, the vehicle delays may increase above the values shown in Table 2, sometimes increasing the LOS to the next level. It should be noted that these LOS conditions do not reflect delays experienced by motorists due to localized congestion, such as double-parked vehicles which may block a travel lane for a period of time. Furthermore, this higher levels of traffic congestion may be exacerbated on those days when an incident occurs on the freeway, typically on the Bay Bridge or in the East Bay on I-80 eastbound. The San Francisco Department of Parking and Traffic estimates these incident conditions occur about 25% to 30% of weekday evenings.

Table 2

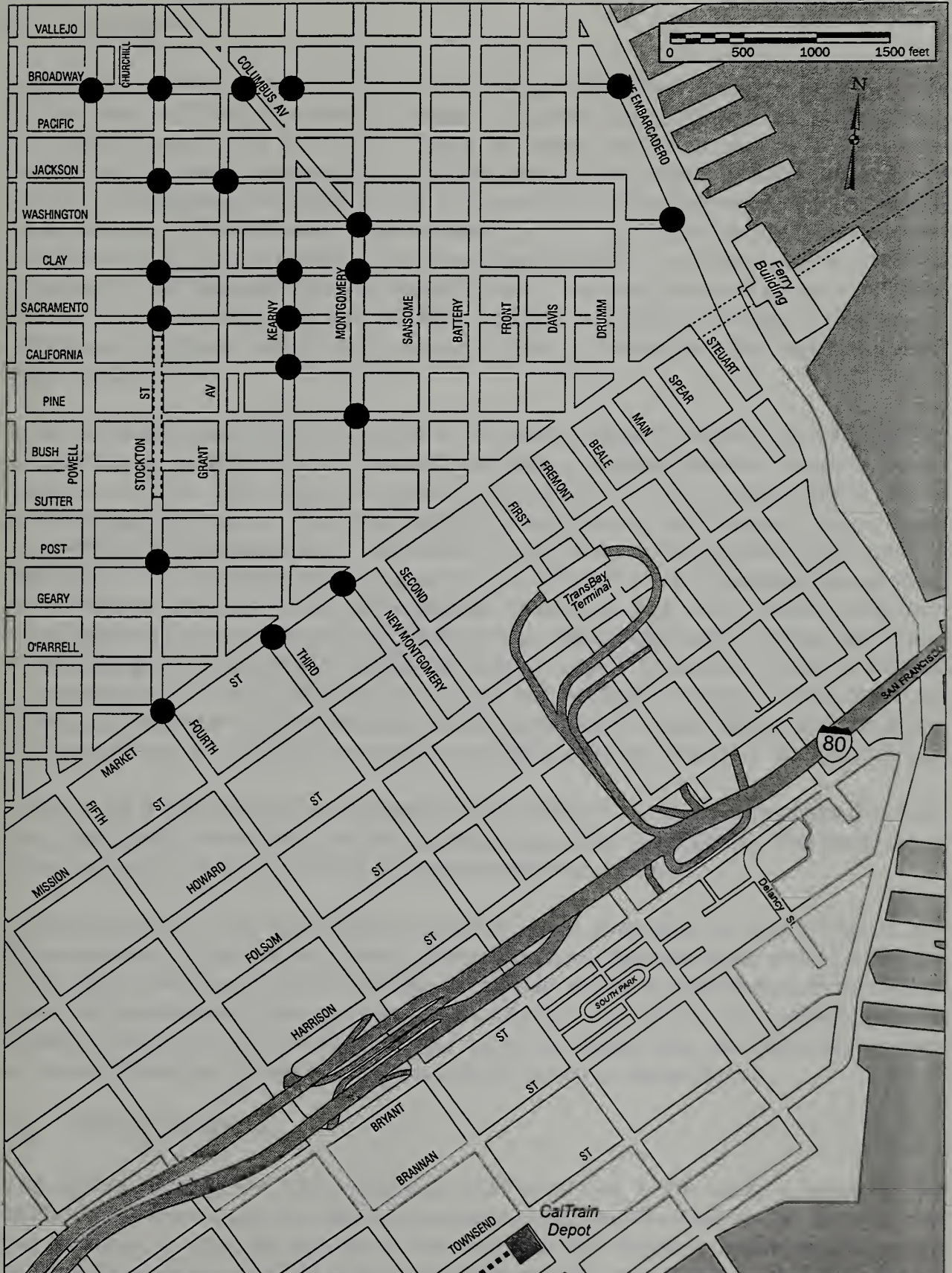
Intersection LOS Analysis Summary

LOS/Delay (seconds per vehicle)

INTERSECTION	1989		Existing		ALT. 1		ALT. 3B		Preferred Alt.	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Clay / Stockton				C/18		C/21		D/39		C/19
Clay / Kearny			B/10	B/12	B/11	B/13	B/12	B/15	B/12	B/13
Clay / Montgomery				B/12		B/15		C/16		B/10
Washington / Kearny				B/7		B/7		B/8		B/9
Washington / Montgomery	B/9	C/18	B/10	B/7	B/10	B/8	B/11	B/8	B/11	B/9
Jackson / Stockton		C/17		B/14		D/28		C/20		B/15
Jackson / Grant		B/7	B/7	B/8	B/7	B/8	B/7	B/8	B/7	B/9
Broadway / Stockton		D/38	B/8	B/12	B/8	B/12	B/8	B/11	B/8	B/11
Broadway / Columbus				B/12		B/12		B/12		B/12
Broadway / Kearny		F/79	B/7	B/8	B/7	B/8	B/7	B/8	B/7	B/9
Broadway / Powell		C/17	B/10	D/8	B/11	D/27	B/11	D/29	B/11	D/30
Sacramento / Stockton				B/8		B/8		B/8		B/9
Sacramento / Kearny			B/6	B/11	B/6	B/11	B/6	B/11	B/6	B/11
California / Kearny	B/10	B/14	B/14	B/11	C/17	C/12	C/17	C/12	C/17	C/12
Pine / Montgomery			B/13	C/16	B/14	C/20	B/13	C/22	B/13	C/18
Post / Stockton	B/8	B/9	B/8	B/9	B/8	B/9	B/6	B/8	B/8	B/9
Third / Market	B/23	B/9	D/32	B/14	E/52	C/19	C/17	B/11	C/17	B/10
Fourth / Market	B/13	B/12	B/14	B/13	B/14	B/14	B/14	C/16	B/14	B/15
New Mont. / Market	B/13	C/17	B/14	C/18	B/15	C/18	B/15	C/16	B/14	C/18
The Embarcadero / Broadway	N/A	N/A	B/9	B/9	C/22	C/22	C/20	D/39	C/20	D/36
The Embarcadero / Washington	N/A	N/A	A/3	A/3	B/14	B/15	B/14	C/22	B/14	C/18

Notes:

Operating characteristics of intersections are described by the use of the concept of level of service (LOS). The Level of Service is a qualitative description of an intersection's performance based on delay per vehicle. Intersection LOS ranges from LOS A, which indicates free-flow or excellent conditions, to LOS F, which indicates jammed or overloaded conditions. Appendix A presents the LOS descriptions for intersections.



CHINATOWN AREA STUDY

Figure 7

ANALYSIS INTERSECTIONS

3.4 TRANSIT

Chinatown is currently served by a variety of bus routes operated primarily by MUNI (See Figure 8). The heart of Chinatown is served by routes on Stockton Street, including the high frequency and heavily used Routes 30 and 45. These two routes provide connections to the Marina Green/Pacifica Heights area and to the 4th/Townsend CalTrain station. Stockton Street is also served by three express bus routes, the 9X, 9AX, and 9BX, with the 9AX and 9BX operating only during the peak commute hours. These express routes connect downtown San Francisco and Chinatown with the Crocker Amazon/Ocean View areas of the City. The eastern edge of Chinatown is served by bus routes operating on Kearny Street. This street is served by the northbound Routes 15 and the express routes 9X, 9AX, and 9BX. Southbound Route 15 operates on Montgomery, one block east of Chinatown and provides connections with the Bayshore corridor and North Beach.

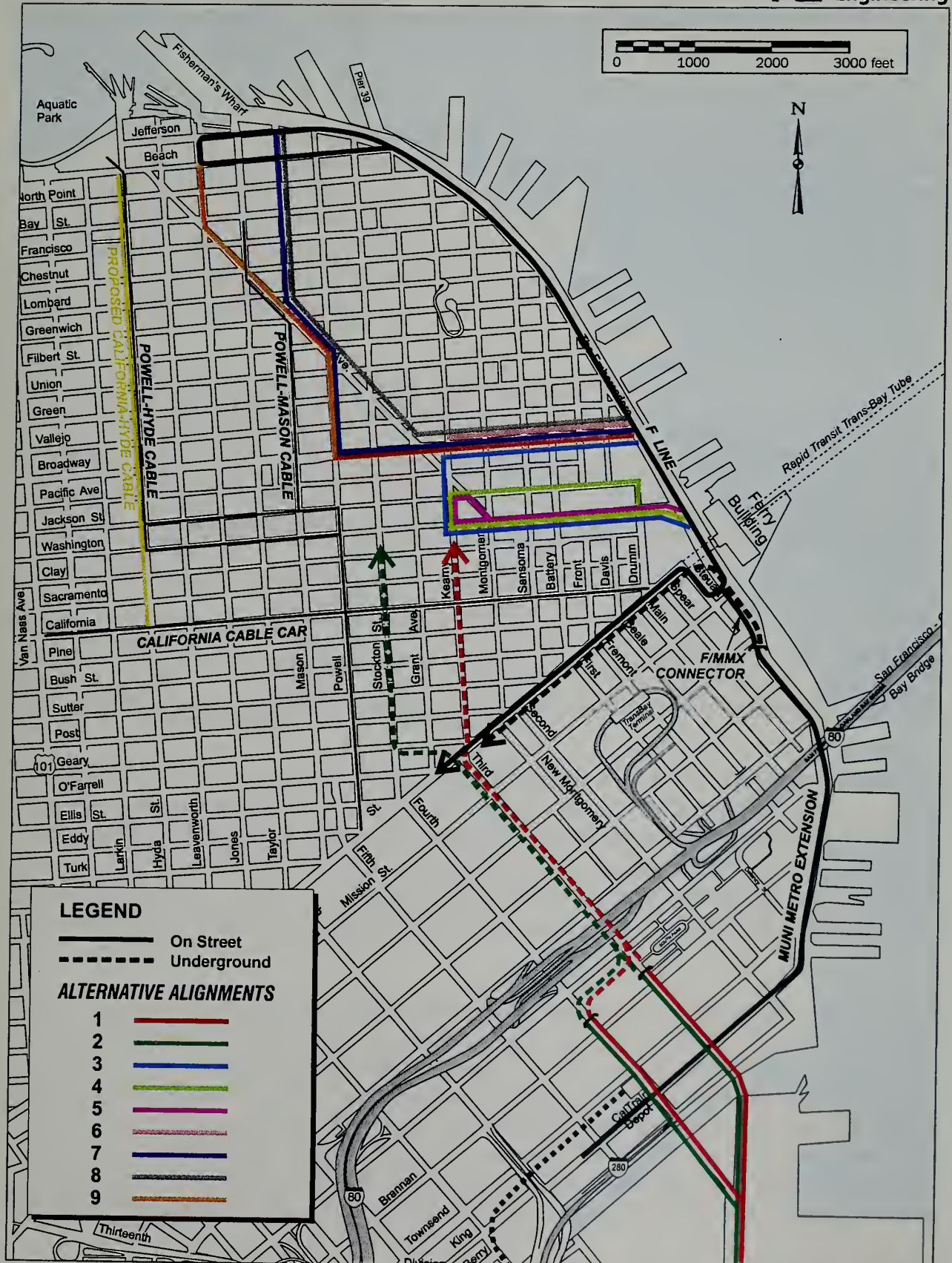
In the east-west direction, the northern edge of Chinatown is served by Routes 12 and 83 operating along Broadway and Pacific Avenue. Route 83 provides a connection between Chinatown and the Van Ness corridor, while Route 12 extends further west into Pacific Heights. Route 30X, a commute peak-only express route, also operates along Broadway and Columbus Avenue in this area, although its nearest bus stop to Chinatown is at Columbus and Montgomery, approximately one block east of the eastern edge of the community. Route 1 provides east-west service along the Sacramento and Clay one-way street couplet. This heavily used route provides connections to the Financial District to the east, and the Richmond District to the west. The peak-only Route 41 runs along Columbus Avenue, skirting the northeast edge of Chinatown. Route 41 provides connections between Pacific Heights/Marina District and the Financial District. Finally, Route 42, a loop route between the CalTrain depot at Fourth/Townsend, Civic Center, Fisherman's Wharf and the Financial District, runs along the eastern edge of Chinatown on Sansome and Battery Streets.

Golden Gate Bridge, Highway, and Bridge District (GGBHTD) operates a ferry shuttle bus route that connects with selected ferry arrivals and departures at the Ferry Building. This route, Route 69, serves within one block of Chinatown along Montgomery Street.

In addition to the bus service to Chinatown described above, three cable car lines provide service to the community. The California Cable Car operates along California Street which borders the south side of Chinatown. On the west edge of the area, service is provided by both the Powell-Hyde and Powell-Mason Cable Car lines. The California Cable Car provides connections to the Financial District and the Van Ness corridor, while the Powell-Hyde and Powell-Mason lines connect to Fisherman's Wharf and the Powell BART station on Market Street.

3.5 TRAVEL DEMAND

The regional existing and future land use information used in this study is based on the Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG) land use database, in which the nine county San Francisco Bay Region is divided into 700 Travel Analysis Zones (TAZ). The TAZ is the basic geographic unit, representing a subdivision of the



CHINATOWN AREA STUDY

Figure 12
ALTERNATIVE RAIL ALIGNMENTS

territory into homogeneous geographical areas where trips are produced or attracted. Within the downtown San Francisco area, TAZs represent between 10 and 20 street blocks. The Chinatown study area encompasses three TAZs. Figure 9 presents the boundaries of the MTC zones in Chinatown.

The Department of City Planning developed as part of the environmental process year 2015 estimates of the number of households and employment levels at the TAZ level, based on citywide ABAG projections for 2010, information about approved projects in the study area, and reasonable assumptions regarding future development. Table 3 shows the year 1990 and estimated 2015 land use intensities for the TAZ within Chinatown. The year 2015 land use projections assume that the Embarcadero Freeway and the TSS would not be re-built and that all the vacated parcels would become available for development.

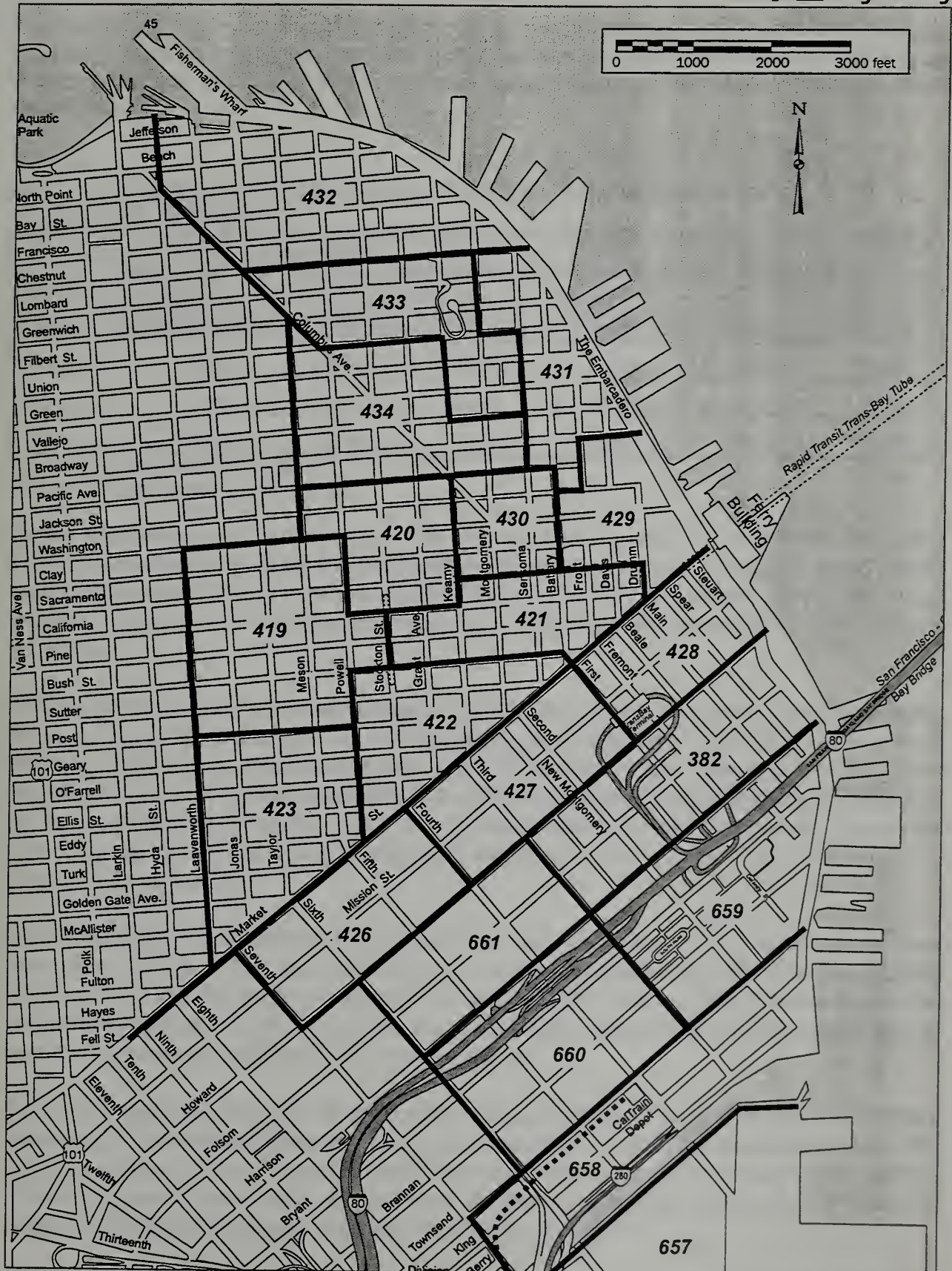
Table 3
YEAR 1990 AND 2015 HOUSEHOLDS AND EMPLOYMENT DATA
CHINATOWN AREA TRAFFIC ANALYSIS ZONES

TRAFFIC ANALYSIS ZONE	YEAR 1990		YEAR 2015	
	TOTAL HOUSEHOLDS	TOTAL EMPLOYMENT	TOTAL HOUSEHOLDS	TOTAL EMPLOYMENT
420	2,636	7,323	3,656	10,677
434	146	12,587	248	17,985
434	3,760	5,808	3,384	6,547
TOTAL	6,542	25,718	7,288	35,209

Source: San Francisco Department of City Planning, ABAG.

The regional MTC travel demand model was utilized to develop future travel forecasts for the different roadway alternatives. The model is able to quantify shifts in travel patterns due to changes in the roadway configuration (i.e.: the removal of the Embarcadero Freeway, opening or closure of streets or freeway ramps, etc.), changes in land uses within the study area and/or the surrounding vicinity, as well as changes in modal split (auto vs. transit) due to anticipated improvements to transit access to the area, as well as other factors such as traffic congestion and parking cost.

Table 4 presents the daily person trips produced and attracted to Chinatown in 1990 and year 2015 estimates by mode of travel. (non-motorized trips such as walk or bicycle are not included.) As shown on Table 4 the increase in households and employment translates into changes in the total number of trips to and from the Chinatown. Total daily person trips to and from Chinatown would increase, between 1990 and 2015, by approximately 2,370 (2%). Table 4 also indicates an increase in total transit trips, about 8,190 (14%), while total automobile trips would decrease about 6,530 (9%), thus increasing daily transit share from 46% in 1990 to around 52% in 2015. This increase towards transit usage, between 1990 and 2015, can be attributed to the proposed transit



CHINATOWN AREA STUDY

Figure 9
MTC MODEL TRAFFIC ANALYSIS ZONES

improvements in the region (BART and MUNI extensions) that will favor using public transportation, especially to access the Market Street and The Embarcadero corridors. Other factors affecting the increase in transit mode choice include higher parking costs and increased regional roadway congestion.

Table 4
DAILY PERSON TRIPS PRODUCED IN AND ATTRACTED TO CHINATOWN AREA
BY YEAR AND BY MODE*

MODE	YEAR 1990			YEAR 2015		
	FROM CHINATOWN	TO CHINATOWN	TOTAL	FROM CHINATOWN	TO CHINATOWN	TOTAL
Transit	17,750	45,540	63,290	20,550	51,650	72,200
Auto	19,430	54,420	73,850	19,180	48,140	67,320
Total	37,180	99,960	137,140	39,730	99,790	139,520

*Does not include non-motorized trips.

Source: MTC and Korve Engineering, Inc.

Similar conclusions can be derived from the analysis of trips to and from Chinatown. Total trips from Chinatown would increase by approximately 7% while total trips to Chinatown would remain practically constant through the year 2015. Transit trips both to and from Chinatown would increase (13% and 16% respectively) while auto trips would decrease (about 12% and 2% respectively).

Tables 5 and 6 present the number of vehicles attracted to and from Chinatown during the AM and PM peak hour for the years 1990 and 2015 by place of origin destination. Similar to Table 4, these tables also indicate the anticipated decrease in the number of vehicles accessing Chinatown. This decrease would be of a lesser magnitude in the off-peak direction of travel (leaving Chinatown in the AM and returning in the PM), which would range between two and four percent, than in the peak direction of travel (entering Chinatown in the AM and leaving in the PM), which would be about nine to ten percent.

Table 5 indicates that during the AM peak hour most auto trips destined to Chinatown would have their origin in the South Bay, the southeast and northwest quadrants (Superdistricts 2 and 3) and the East Bay, while the largest destinations for auto trips with their origin in Chinatown would be the northeast quadrant of the City (Superdistrict 1). Relative changes in the ranking of origins or destinations between 1990 and 2015 would be minimal.

Table 6 indicates that during the PM peak hour most auto trips destined to Chinatown would have their origin in the northeast quadrant of the City (Superdistrict 1), while the largest destinations for auto trips with their origin in Chinatown would be the northeast, northwest and southeast quadrants of the City plus the South Bay. Similar to the AM peak hour, relative changes in the ranking of origins or destinations between 1990 and 2015 would be minimal.

Table 5

**VEHICLE TRIPS PRODUCED OR ATTRACTED IN CHINATOWN AREA
FROM ALL ORIGINS/DESTINATIONS
AM PEAK HOUR**

MODE	YEAR 1990		YEAR 2015	
	FROM CHINATOWN	TO CHINATOWN	FROM CHINATOWN	TO CHINATOWN
S.F. SUPERDISTRICT 1 ¹	280	321	270	340
S.F. SUPERDISTRICT 2	132	445	109	451
S.F. SUPERDISTRICT 3	100	484	109	407
S.F. SUPERDISTRICT 4	27	200	20	159
SOUTH BAY	100	617	94	547
EAST BAY	155	473	156	407
NORTH BAY	41	340	45	284
CHINATOWN	70	70	61	61
TOTAL	905	2,950	894	2,656

Source: MTC and Korve Engineering, Inc.

Table 6

**VEHICLE TRIPS PRODUCED OR ATTRACTED IN CHINATOWN AREA
FROM ALL ORIGINS/DESTINATIONS
PM PEAK HOUR**

MODE	YEAR 1990		YEAR 2015	
	FROM CHINATOWN	TO CHINATOWN	FROM CHINATOWN	TO CHINATOWN
S.F. SUPERDISTRICT 1	665	664	669	657
S.F. SUPERDISTRICT 2	579	282	579	278
S.F. SUPERDISTRICT 3	539	205	511	238
S.F. SUPERDISTRICT 4	204	56	168	42
SOUTH BAY	609	208	534	179
EAST BAY	537	260	437	254
NORTH BAY	354	95	302	77
CHINATOWN	184	184	156	156
TOTAL	3,671	1,954	3,356	1,881

Source: MTC and Korve Engineering, Inc.

¹Superdistricts are travel analysis zones established by the Metropolitan Transportation Commission (MTC). These Superdistricts provide a basis for geographic subareas in the City of San Francisco. A map of the Superdistricts is provided in Appendix A.

Excluding local trips being made within the Chinatown Area, the travel demand numbers indicate that any transportation solutions which provide increased accessibility for the South and East Bay, as well as the northeast and southwest portions of the City will provide the maximum benefit in terms of reducing traffic congestion.

4. TRAFFIC

This section presents the traffic issues and concerns presented by the community at the various community meetings, and summarizes these issues into two overall issues for discussion. Potential solutions identified by the community were explored and alternative solutions were pursued and described in section 4.3.

4.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY

The following issues were identified by the community during the public workshops on December 28, 1995 and January 16, 1996, and during preliminary meeting with various Chinatown community organizations.

- Loss of accessibility with removal of Embarcadero Freeway
- Limited east/west street capacity
- North/south routes not direct
- Local vs. through traffic
- Localized traffic issues
- On-street parking impeding traffic flow
- Large trucks using local/minor streets during peak hours
- Trucks/double parked vehicles block traffic (including bus and emergency vehicle) on Sacramento and Clay Streets between Kearny and Columbus
- Empty lot on Kearny between Washington and Jackson should become parking lot
- There is no gateway between The Embarcadero and the streets that provide access to Chinatown (i.e., Washington and Broadway)
- There needs to be an overall evaluation of east/west streets
- Construct parking garage on Blocks 202/203 or at intersection of The Embarcadero and Broadway and shuttle to Chinatown
- Reasonable North/South corridors are Sansome/Battery, Franklin/Gough and The Embarcadero
- Hills filter some traffic west vs. east. Stockton is used because is flat
- Gridlocked intersections on Powell Street at Washington, Jackson and Pacific due to 3-phase signal
- At intersection of Clay/Powell, there is a school bus contra-flow lane
- The split roadway (versus paired) configuration of The Embarcadero in front of the Ferry Building is better for Chinatown
- Clay Street should go through to connect with The Embarcadero - couplet with Washington Street
- Washington, Jackson, Clay and Sacramento maybe should be reversed to one way in the opposite direction. Pacific Avenue maybe should be two-way.
- When open Davis Street, what will be the control - signal or STOP sign
- Traffic, transit, parking and land use usually discussed in isolation. This should not be the case.

- Intersections that are problems are Clay/Stockton, Powell/Washington, Powell/Jackson and Powell/Pacific.
- Cones or other lane markers to force vehicles in exclusive turn lanes to make the turns required, and to prohibit vehicles from changing lanes in an intersection to avoid a forced right or left turn may be needed.
- Increase in enforcement and the use of PCOs should not be limited to Chinatown, but also address problems "downstream" on Stockton Street through the Union Square area.
- If loading/unloading delivery opportunities are removed from the street, alternatives need to be provided.

4.2 SUMMARY OF ISSUES

- Since the Embarcadero Freeway was removed the direct identifiable routes to Chinatown have also been removed and routing to Chinatown is not clear. The interim traffic improvements implemented in 1990, included improved destination guide signs, but should be reassessed and expanded to assist motorists to the most direct and quickest routes to take to access and leave Chinatown.

In addition, with removal of the Embarcadero Freeway on-ramps at Clay and Broadway, drivers, particularly those destined to Peninsula and south San Francisco, have rerouted to alternate north/south paths within Chinatown. This resulted in increased traffic congestion and delay for local Chinatown traffic.

- Within Chinatown there is localized congestion which delays auto and transit vehicles. This congestion existed before the earthquake, but with the dispersion of traffic following the removal of the Embarcadero Freeway, this congestion has been exacerbated. It is due in part due to additional vehicles and to double parking of autos and trucks, buses blocking moving traffic when they are not able to use bus stops within Chinatown, and congestion "adjacent" to Chinatown such as near Union Square. In addition, vehicles looking for on-street and off-street parking add to the congestion, and pedestrian traffic crossing the streets also impedes the ability of vehicles to complete turns.

4.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS

Improvements to facilitate traffic access to and from the Chinatown area and within Chinatown relate to improving existing conditions. Since traffic is not expected to increase substantially between existing conditions and year 2015 conditions, measures to improve existing conditions would also be effective for future year conditions.

Towaway Zones: Extend peak period No Parking/Towaway on Sacramento and Clay Streets to facilitate vehicular traffic and transit flow. The Department of Parking and Traffic will further evaluate this proposal and work with the community to implement.

- Sacramento Street between Kearny and Powell Streets (north side): Current towaway/bus

lane between 7:00 AM and 6:00 PM between Drumm and Kearny Streets should be extended to 7:00 PM. The towaway zone between 4:00 and 6:00 PM between Kearny and Powell Streets should be extended to between 3:00 and 7:00 PM. The number of spaces affected would be 12 metered loading/unloading, 6 metered and 13 non-metered parking spaces between Kearny and Powell Streets, and approximately 63 spaces between Drumm and Kearny Streets. This extension to between 3:00 and 7:00 PM should not affect the loading/unloading of merchandise, as most of these transactions are completed prior to 3:00 PM.

- Clay Street at the approach to Kearny Street (south side): Between Walter Lum Place and Kearny Street extend towaway to between 7:00 AM and 6:00 PM to maintain two travel lanes across Kearny Street. This approach also provided access to the Portsmouth Square garage (right lane is channelized to access the garage) and the queues occasionally block the one lane for through traffic.

On-street parking regulations on Stockton Street were evaluated to determine if any changes to the current regulations are warranted. It was determined that rather than revise or extend the duration of the restrictions, enforcement of the current regulations should be increased.

Destination Guide Signs: Improve signage on I-80/Bay Bridge, U.S. 101, I-280, ramps and local streets for traffic destined to Chinatown and North Beach to help visitors find Chinatown.

Immediate Changes:

- Fremont Street and Pine Streets - add signs directing traffic northbound on Fremont to Pine and to Kearny. This will facilitate access to St. Mary's and Portsmouth Square garages.
- Add signs directing traffic leaving Chinatown to use Broadway and Clay Street to reach The Embarcadero.
- Add sign on The Embarcadero at Washington and at Broadway.

Changes when King Street ramps to I-280 open (1997):

- Add signs on northbound U.S. 101 directing Chinatown, North Beach and Fisherman's Wharf traffic to use I-280 to King Street.
- Add signs on King Street and The Embarcadero for Chinatown, North Beach and Fisherman's Wharf.

Changes after retrofit of west approaches to the Bay Bridge and construction of a new off-ramp at Fremont and Folsom Streets (1997/1998):

- Change last sign on Bay Bridge to read "Next 2 Exits" rather than "Next Left"
- Add signs on Folsom and The Embarcadero directing traffic to Chinatown, North Beach and Fisherman's Wharf.

Visitor Education/Best Routes: Educate visitors through brochures and signing as to best routes to take to Chinatown and locations of parking garages in order to facilitate access and reduce drivers circling around Chinatown looking for on-street or off-street parking. Specifically, the best routes should include Broadway to and from Vallejo Street Garage, Washington/Clay to and from

Portsmouth Square Garage, and Third/Fourth Streets to and from Portsmouth, St. Mary's, Sutter/Stockton and Fifth/Mission Street garages. The use of Hyde and Eight Streets as an alternative access route to U.S. 101 should be encouraged.

Enforcement: In order to ensure that illegal traffic and parking activities do not continually congest streets and impede traffic and transit flow, an enforcement program should be implemented in Chinatown and in Union Square, particularly on Stockton Street between Sutter and Market Street. Additional Parking Control Officers (PCOs) should be provided for enforcement of existing traffic regulations (no parking in red zones, no parking during towaway hours, no blocking of intersections).

The following actions should be included in the program:

- Community outreach/education: sufficient time should be given to fully inform the community of the changes/enforcement to be made, and the benefits expected as a result of the enforcement.
- Increased number of enforcement officials in the early stages of implementation so as to reinforce the need for changes in attitudes or behavior. The enforcement can then taper off with periods of increased enforcement occurring later.

Enforcement of existing regulations should be throughout Chinatown and Union Square, however, enforcement should be focused on the streets with transit, particularly Stockton, Clay, Sacramento, Kearny and Montgomery.

Signal Timing/Signal Systems: The Department of Parking and Traffic is currently studying the possibility of improving the downtown and Chinatown signal system. If the Chinatown signals were to be coordinated with the downtown system, major streets providing access to Chinatown would be coordinated with the streets south of Market Street that provide access to the regional freeway.

- Interconnect Stockton Street and Grant Avenue, and possibly Broadway to the downtown signal system. The reevaluation of these signals could potentially improve the progression of traffic through Chinatown, and Broadway would become a more attractive route to The Embarcadero and the I-80 eastbound ramps. The provision of a westbound left turn bay from Broadway onto Stockton should be explored as part of the interconnect system.

In addition, the potential for improving signal coordination at intersections that are on travel routes to parking garages should be included in this project. For example, the route between Fremont, Pine and Kearny Street could be coordinated so that the green times for the major movements overlap, reducing the amount of time a vehicle is waiting at a red signal.

- Montgomery Street is often congested during the PM peak period. The signal timing on Montgomery Street, between California and Sutter Streets, should be re-evaluated. Improvements to traffic flow could be achieved by maintaining the all-pedestrian phase that currently exists at these intersections, but changing the cycle length to be consistent with

adjacent streets (i.e., 60 seconds).

- The potential for an all-pedestrian phase to facilitate pedestrian crossing was evaluated for the intersection of Stockton and Sacramento and Stockton and Jackson. The concept of an exclusive pedestrian phase was evaluated. All-pedestrian phases are used at intersections to accommodate heavy pedestrian movements or where heavy pedestrian movements conflict with heavy vehicle turning movements.

Pedestrian movements are heavy in Chinatown and particularly on Stockton Street throughout the day, and pedestrian crossing the street conflict with vehicles attempting to turn. While an all-pedestrian phase could potentially facilitate the movement of pedestrians and therefore traffic through the intersection, based on field observations within Chinatown, it is not anticipated that an all-pedestrian phase would be effective in restricting pedestrian movements to the pedestrian phase. Without compliance with the pedestrian phase (no pedestrian crossing against the red), the all-pedestrian phase would only reduce the available green time for traffic flow while conflicts with pedestrians continue to delay turning traffic. However, the concept of an all-pedestrian phase should be evaluated further.

Change in Street Directions: The possibility of changing the street direction of a number of streets was raised as a potential measure to improve flow for vehicles and transit. The east/west streets of Sacramento, Clay, Washington and Jackson were identified as candidates, as the directions for these streets were changed as part of the construction of the Embarcadero Freeway. A preliminary assessment of changing of street directions of these streets and the following issues were identified:

- The change in the direction of Sacramento and Clay Streets would be beneficial to the electric trolley lines in that the steeper Sacramento Street (grades of 10 to 18 percent) would be used by inbound (eastbound/downhill) buses to downtown/Chinatown, while Clay Street (grades of 10 to 15 percent) would be used by outbound (westbound/uphill) buses. However, changes to the overhead wires would be required for the MUNI lines.
- Access to Chinatown from the east would be more indirect. Even if the segment of Washington Street between The Embarcadero and Drumm were to remain two-way, traffic would need to access Jackson or Clay Street to continue westbound into Chinatown.
- The queue for the Portsmouth Square garage is currently from Clay Street eastbound via a channelized left turn lane. If Clay Street were to become westbound, access to the garage would become less direct (westbound vehicles on Clay Street would turn onto Kearny Street to access the garage) and the queue on Kearny Street would become less manageable.
- The reorientation of one-way routes would have to be carried all the way to Broadway to eliminate duplication of two streets in a row with the same direction of traffic flow.

- The change of Washington Street from westbound to eastbound could impact the future of rail transit service on the Washington/Jackson corridor. The extension of the proposed Bayshore line is recommended on Washington, Kearny, Jackson and Columbus (see Section 5.3). The change in street directions of Washington and Jackson would preclude the loop and terminal at Kearny Street between Washington and Jackson.

In order to fully access the impact of the change in street directions, additional information on traffic volumes and patterns on these streets in Chinatown and Nob Hill would need to be collected and evaluated. Similarly, changes required to transit routes and overhead equipment would also need to be accessed.

Northeast Quadrant Study: Although two major studies, the *Alternatives to Replacement of The Embarcadero Freeway and the Terminal Separator Structure* and the *Central Freeway* have addressed transportation conditions in most of the northeast quadrant of San Francisco, a comprehensive study that evaluates the northeast quadrant as a whole has not been conducted. It is recommended that a comprehensive study be undertaken to address the transportation issues of the downtown and Civic Center, as well as Chinatown, North Beach, Fisherman's Wharf as well as the northern and southern waterfront.

It is envisioned that this study would evaluate the changes in travel patterns in the entire northeast quadrant, assess existing transportation infrastructure, identify needs for short term and long term transportation improvements, and propose recommendations.

5. TRANSIT

5.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY

The following transit issues were identified by the community during the public workshops on December 28, 1995 and January 16, 1996, and during preliminary meeting with various Chinatown community organizations.

- Increased traffic congestion slows down and impedes maneuverability of buses
- Parking and loading/unloading activities impede transit flow
- Bus service to and through Chinatown should be expanded
- Rail (surface or underground) service to Chinatown is limited
- Extensions/linkages with North Beach and Fisherman's Wharf
- Jitney buses/water shuttle/hotel shuttles
- Golden Gateway shuttle
- Cable car extension - California to Ferry Plaza
- F-Market line extension - loop to Broadway/Powell/Columbus
- F-Market line extension - Washington/Kearny/Broadway
- Bus island - e.g., Stockton & Ellis
- Request SamTrans to implement weekend service on their bus line to Chinatown.

5.2 SUMMARY OF ISSUES

- The transit services described in section 3.4 have not changed substantially since before the 1989 Loma Prieta earthquake. All of Chinatown is within easy walking distance of one or more bus routes. Service is frequent on many routes, and connections to other MUNI transit services and regional transit systems such as BART and CalTrain are readily available. Overall, service frequencies and coverage appear adequate to meet the general transit needs of the community.

Some problems have been identified. Traffic conditions in and around the Chinatown area are frequently congested. Buses moving through the area are often delayed because of commute traffic congestion. Pedestrian activity also plays a role in delaying buses, particularly at locations where buses making a left or right turn must wait for pedestrians to clear the crosswalk before clearing the intersection. It has been reported in public meetings that pedestrian crossings sometimes allow only one or two vehicles to make a turn during each traffic signal cycle. Some buses (such as Route 15) are known to be consistently overcrowded in some segments of the route. This effect is partially the result of traffic delays. When a bus is delayed, riders waiting at bus stops accumulate until a bus finally arrives, and then board the bus. The effect for some riders is that a bus doesn't arrive until after its scheduled time, and then when it does arrive, it is often overcrowded because of the accumulation of riders who had been waiting further up the line.

While existing bus service serving Chinatown provides good service coverage, overcrowding and congestion reduce the effectiveness of this service. Improvements to facilitate the movement of buses through Chinatown and additional transit service into and through Chinatown should be implemented.

- There has been a strong desire to have additional rail service into Chinatown. Extension of rail service either through proposed Third Street/Bayshore Corridor or the F-Market line to serve Chinatown is desired.

5.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS

The study team reviewed existing service to identify where adjustments to existing services or addition of new services could provide improved accessibility and operating conditions for transit within the Chinatown area. The following potential improvements were identified and improvements to the bus routes and shuttles are shown on Figure 10:

Bus Transit

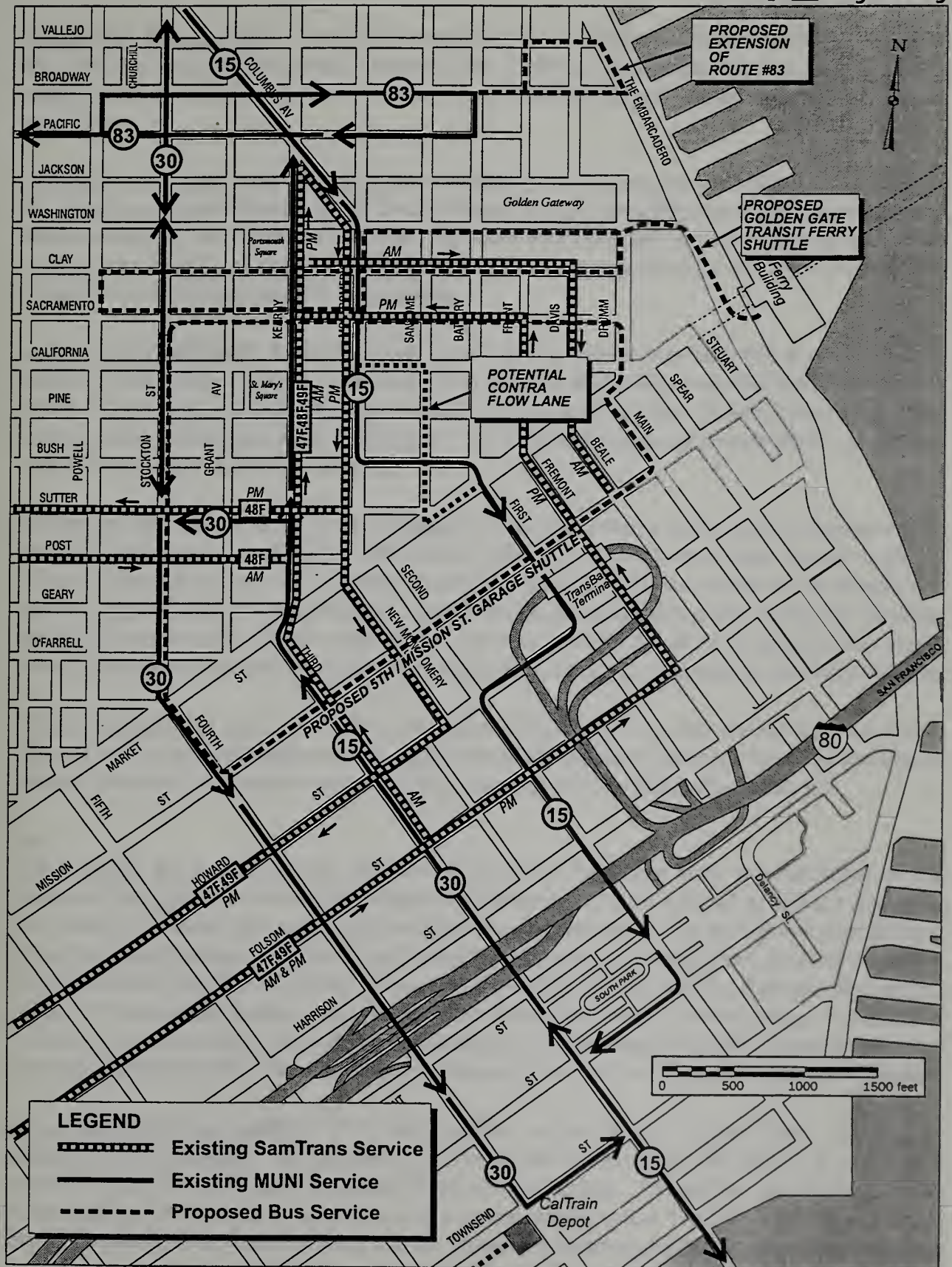
Bus Islands/Bulbs: Evaluate potential for adding bus islands and bulbs to facilitate bus loading/unloading. Specific locations have not been identified, but places where buses must merge across one or more lanes of heavy traffic to reach a bus stop would be logical candidates. Bus stops along Sacramento and Clay Streets have been identified by MUNI as potential candidates.

Bus bulbs or islands would have the effect of improving bus operating speeds and reliability by reducing the potential for buses being blocked by autos, as well as increase operational safety for passengers loading and unloading. This program could be added to MUNI's ongoing operations planning, and would need to include the participation of the Department of Parking and Traffic and the community.

MUNI Route #83 Pacific: Extend Route #83 to The Embarcadero to provide connection to the F-Market line service via Broadway, Davis Street and The Embarcadero. This extension would provide a convenient connection between Chinatown and the waterfront, and allow transfers to transit services along The Embarcadero.

At this time it is anticipated by MUNI that this service change could be incorporated into the existing schedule without adding vehicles or paid driver hours.

MUNI Route #15 Third Street: Provide a viable transit lane for the #15 line to avoid the worst of the downtown traffic congestion and improve travel times through downtown. One possibility that is currently being considered by MUNI is to create a transit-only contraflow lane on Sansome Street and rerouting the #15 to this lane. While this change would not occur within Chinatown, it would allow the #15 to operate at faster speed and be more reliable and, thus, provide benefits to Chinatown.



CHINATOWN AREA STUDY

Figure 10

BUS AND SHUTTLE IMPROVEMENTS

MUNI Route #30 Stockton: Pursue the planned provision of articulated buses on the #30 Stockton line to provide for additional capacity on this route. Additional passenger capacity, combined with enforcement of traffic and parking regulations on Stockton Street, would enhance service for passengers.

MUNI Route #38 Geary and #9X San Bruno: Evaluate express and frequent MUNI service directly from the Sunset and Richmond via the #38 Geary line by rerouting some runs to Washington Square instead of the Transbay Terminal. Evaluate extending #9X service to weekends. MUNI will try to evaluate these proposals in FY 96/97, acknowledging that their current highest priority is restoration of service reliability systemwide.

Golden Gate Transit #69: Request Golden Gate Transit to initiate bus route #69 (the ferry shuttle) service on weekends to serve Chinatown. One possible alignment would be, from Montgomery Street, extend the service along Sacramento and Clay as far west as Powell Street. Weekday service could also be extended in this manner. This improvement would provide direct connections between Chinatown and ferry services.

Discussions with Golden Gate Transit revealed that commute buses laying over in downtown San Francisco are used to provide the ferry shuttle service. Since Golden Gate Transit does not provide extensive service into downtown during the weekends, buses would not be available to provide the shuttle service to downtown. The extension of the shuttle service during the weekday should be pursued with Golden Gate Transit, and the potential for MUNI to provide this shuttle service during the weekends should be explored as part of the #83 extension to the Ferry Building.

SamTrans #47F, 48F, 49F: SamTrans currently provides limited commute service between Foster City and the downtown/Chinatown area. Extension of the service to weekend hours would provide a transit option for Chinatown visitors already using this service during the weekdays.

Rail

The potential for extending light rail service into the Chinatown area was identified at the community workshops as a desirable transit improvement. Potential light rail extensions that have been identified include extensions from the planned F-Market line on The Embarcadero, extension of the proposed Bayshore Corridor via a Central Subway across Market Street, and the extension of the proposed Bayshore Corridor via the MUNI Metro Extension and the F-Market line tracks. Figure 11 presents the location of the MUNI Metro Extension south of Market Street, the planned F-Market line on Market Street and The Embarcadero, the proposed F-Line/MMX track connection between the MUNI Metro Extension and the F-Market line, and the proposed Bayshore Corridor.

Proposed Bayshore Corridor: The Transportation Authority's 4-Corridor Plan, adopted in September 1995, identifies the Bayshore Corridor as the highest priority out of four proposed rail corridors in the City to receive Proposition B rail corridor funding. The corridor envisions at-grade service along Third Street in Bayshore, and a tunnel section under Third or Fourth Street in the South of Market area, then crossing Market Street and heading north into potential Chinatown terminal at either Kearny or Stockton Streets.

The Bayshore Corridor EIR/EIS is anticipated to begin in the Summer of 1996. This EIR/EIS will analyze the alternatives for the Corridor. Because of the high costs of the tunnel sections, and given the uncertainties about future availability of federal funding, the Bayshore EIR will also look at ways to phase the project, including connections to the MUNI Metro Extension at King Street.

It should be noted that any Bayshore Corridor extension to Chinatown would represent a minimal increase in the operating cost of the Bayshore Corridor and would not require the need for additional vehicles. As noted above, as currently envisioned, the Bayshore Corridor would not terminate at Third and King Streets, but would continue into downtown either along Third Street, or Market Street via the MUNI Metro Extension.

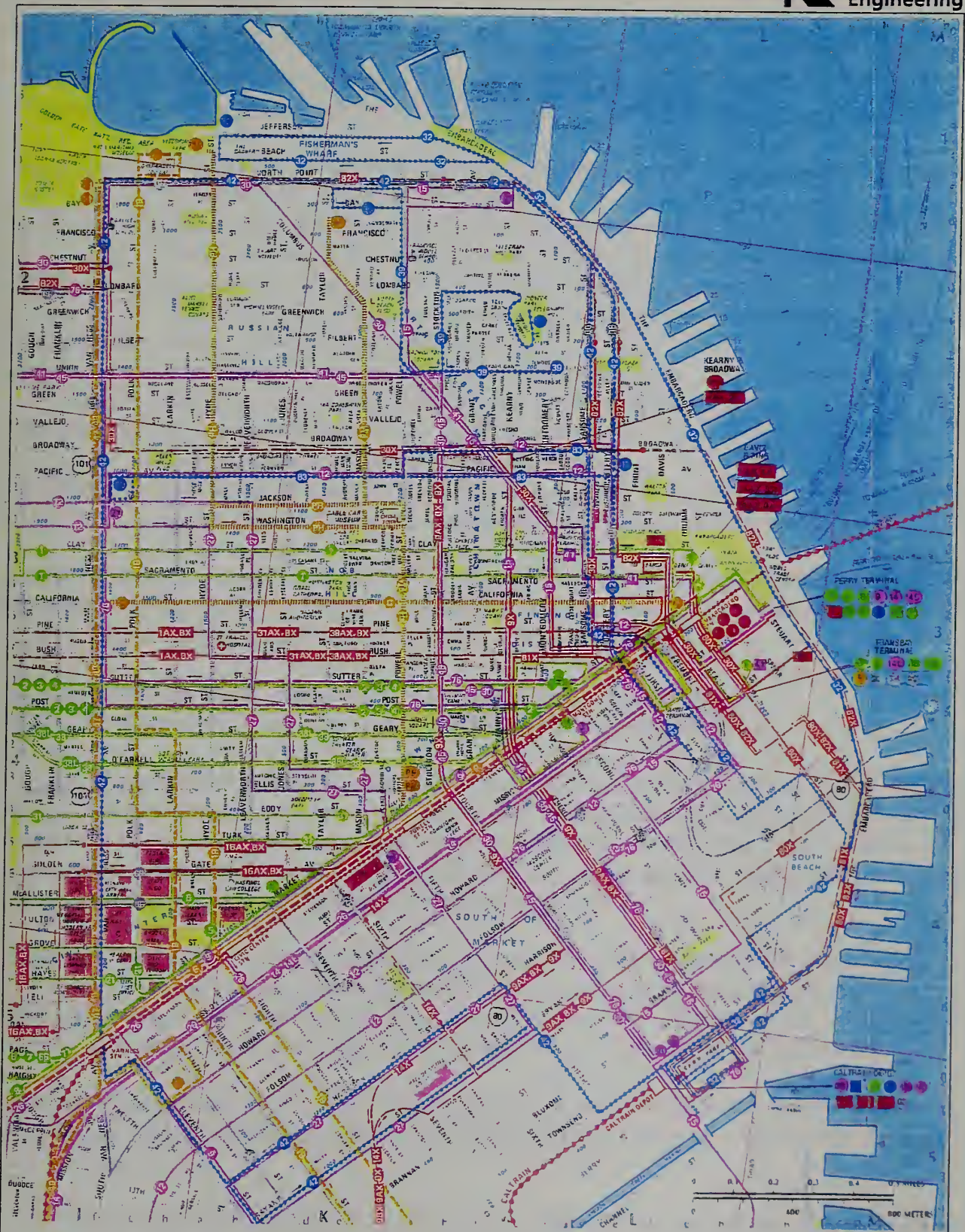
F-Market Line: The extension of the historic MUNI F-Market line into the northern waterfront is currently either in operation (Market Street), in construction (section between Broadway and North Point, and North Point and Powell) or in design stages (Mid-Embarcadero, Lower Market sections and Fisherman's Wharf loop). This surface electric streetcar service will be provided from Upper Market at Castro Street to the waterfront via Market Street, and north to Fisherman's Wharf via The Embarcadero, Jefferson Street, Jones Street and Beach Street. It is anticipated that the service will be fully implemented in 1999.

The F-Market line will provide a link between the northeast waterfront and the City's main hotel, shopping and government districts, as well as residents along Upper Market Street neighborhoods. It will also relieve some of the overcrowding on the cable car system, which currently provides the principal transit connections for visitors to Fisherman's Wharf.

Figure 12 presents the alternative rail alignments that were evaluated as part of this study. They include six Bayshore Corridor extensions and seven F-Market line extensions. Appendix B contains figures for each alignment and potential station locations.

Bayshore Corridor Extensions:

- Alignment 1: via subway on Third Street and Kearny Street
- Alignment 2: via subway on Third Street and Stockton Street
- Alignment 3: via MUNI Metro Extension and F-Market line, with access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street and Broadway
- Alignment 4: via MUNI Metro Extension and F-Market line, with access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Drumm Street and Washington Street
- Alignment 5: via MUNI Metro Extension and F-Market line, with access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Columbus Avenue and Washington Street
- Alignment 6: via MUNI Metro Extension and F-Market line and into Chinatown via Broadway



Source: San Francisco Municipal Railway

CHINATOWN AREA STUDY

Figure 8

EXISTING TRANSIT SERVICE

F-Market Line Extensions:

The proposed Bayshore Corridor extension alignments into Chinatown via Washington and Broadway (alignments 3 through 6) were also evaluated for the MUNI F-Market line extensions. In addition, three F-Market line loops to Fisherman's Wharf were evaluated.

- Alignment 3: access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street and Broadway
- Alignment 4: access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Drumm Street and Washington Street
- Alignment 5: access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Columbus Avenue and Washington Street
- Alignment 6: access into Chinatown via Broadway
- Alignment 7: access into Chinatown from The Embarcadero via a loop on Broadway, Powell Street, Columbus Avenue, Mason Street to Fisherman's Wharf
- Alignment 8: access into Chinatown from The Embarcadero via a loop on Broadway, Columbus Avenue, Mason Street to Fisherman's Wharf
- Alignment 9: access into Chinatown from The Embarcadero via a loop on Broadway, Powell Street, Columbus Avenue, Jones Street to Fisherman's Wharf

Table 7 presents a matrix summary of the Bayshore and F-Market line alignments that were evaluated and provides preliminary estimates of track miles, order of magnitude cost and station characteristics, as well as potential problems for each alternative.

Bayshore Alignment 1: via subway on Third Street and Kearny Street

Bayshore Alignment 2: via subway on Third Street and Stockton Street

Based on preliminary studies conducted for the Bayshore Corridor and the travel demand projections presented in section 3, the extension of the Bayshore Corridor from Third and King Street in a tunnel under Third Street, then crossing Market Street and heading north into Chinatown would best serve the Chinatown area. However, both of the subway extensions would have substantial capital costs and operating and maintenance costs.

Either the Third/Kearny or Third/Stockton subway extension would provide a direct linkage between the downtown /hotel district and Chinatown, and would create a convenient way of travel between Chinatown and the Chinese community located in and around the Visitacion Valley area, as well as providing access to the East and South Bay via connections at BART and MUNI.

Bayshore Alignment 3: via MUNI Metro Extension and F-Market line, with access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street and Broadway

The extension of the Bayshore Corridor via a surface route utilizing existing and planned track on The Embarcadero is a lower cost alternative to the subway extensions described above. The

Table 7

Transit Evaluation Matrix

Alignment #	Bayshore Corridor Extensions	Track Miles	Cost (\$1,000,000)	Travel Times (2)	Terminal	Stations (3)	Parking Loss	Potential Problems/Patronage Issues
1	Bayshore Corridor Extension via subway via Third and Kearny	3.1	Capital: 390 O&M: 2.24 Vehicle: NA		Kearny	2	None	Cost and Schedule
2	Bayshore Corridor Extension via subway via Third and Stockton	3.5	Capital: 460 O&M: 2.51 Vehicle: NA		Stockton	2	None	Cost and Schedule
3	Bayshore Corridor Extension via Washington/Kearny/Broadway (surface/ In mixed traffic)	1.2	Capital: 23 O&M: 1.2 Vehicle: NA	AM Peak - 8 min. PM Peak - 8 min. Weekend - 7 min.	Kearny	5	Stations: 22 Terminal: 8 ROW: 67	10.9% grade at Kearny approach to Broadway Plans for St.Mary's School/CCHC housing at terminal Provides direct connection to Bayshore patrons Property taking at Kearny Street and relocation of MUNI bus stop and tour bus parking
4	Bayshore Corridor Extension via Washington/Kearny/Jackson (surface/ In mixed traffic)	1.2	Capital: 23 O&M: 1.1 Vehicle: NA	AM Peak - 9 min. PM Peak - 10 min. Weekend - 9 min.	Kearny	5	Stations: 22 Terminal: 8 ROW: 67	Plans for St. Mary's School/CCHC housing at terminal Provides direct connection to Bayshore patrons Property taking at Kearny Street and relocation of MUNI bus stop and tour bus parking
5	Bayshore Corridor Extension via Washington/Kearny/Washington (surface/semi-exclusive ROW)	1.2	Capital: 23 O&M: 1.1 Vehicle: NA	AM Peak - 7 min. PM Peak - 8 min. Weekend - 7 min.	Kearny	5	Stations: 22 Terminal: 8 ROW: 150	Plans for St.Mary's School/CCHC housing at terminal Provides direct connection to Bayshore patrons Property taking at Kearny Street and relocation of MUNI bus stop and tour bus parking
6	Bayshore Corridor Extension via Broadway Stub (surface/ In mixed traffic)	1.0	Capital: 14 O&M: 1.2 Vehicle: NA	AM Peak - 8 min. PM Peak - 8 min. Weekend - 8 min.	Broadway	5	Stations: 24 Terminal: 16 ROW: NA	No room for terminal except middle of street Provides direct connection to Bayshore patrons Removal of parking on Broadway

Notes:

(1) Cost for Bayshore Corridor Extension alignments from Third/King Streets.

Capital costs for surface rail estimated at \$18 million per mile of single track, \$25 million double track.

Operating and Maintenance costs at \$10.26 per train mile

(2) Travel times do not include terminal layover times

(3) Stations north of Market Street for tunnel alignments, and west of The Embarcadero for F-Line and Bayshore extensions from The Embarcadero

NA - Not Applicable

Table 7 (continued)
Transit Evaluation Matrix

Alignment #	F-Market Line Extensions	Track Miles	Cost (\$1,000,000)	Travel Times (2)	Terminal	Stations (3)	Parking Loss	Potential Problems/Patronage Issues
3	F-Market Line Extension via Washington/Kearny/Broadway (surface/ In mixed traffic)	1.2	Capital: 23 O&M: 2.9 Vehicle: 4.5	AM Peak - 8 min. PM Peak - 8 min. Weekend - 7 min.	NA	5	Stations: 30 Terminal: NA ROW: 67	10.9% grade at Kearny approach to Broadway Plans for St.Mary's School/CCHC housing at terminal Does not provides direct connection to Bayshore Property taking at Kearny Street
4	F-Market Line Extension via Washington/Kearny/Jackson (surface/ In mixed traffic)	1.2	Capital: 23 O&M: 2.7 Vehicle: 4.5	AM Peak - 9 min. PM Peak - 10 min. Weekend - 9 min.	NA	5	Stations: 30 Terminal: NA ROW: 67	Plans for St.Mary's School/CCHC housing at terminal Does not provides direct connection to Bayshore Property taking at Kearny Street
5	F-Market Line Extension via Washington/Kearny/Washington (surface/ semi-exclusive ROW)	1.2	Capital: 23 O&M: 2.7 Vehicle: 4.5	AM Peak - 7 min. PM Peak - 8 min. Weekend - 7 min.	NA	5	Stations: 30 Terminal: NA ROW: 150	Plans for St.Mary's School/CCHC housing at terminal Does not provides direct connection to Bayshore Property taking at Kearny Street
6	F-Market Line Extension via Broadway Stub (surface/ In mixed traffic)	1	Capital: 14 O&M: 2.9 Vehicle: 4.5	AM Peak - 8 min. PM Peak - 8 min. Weekend - 8 min.	NA	5	Stations: 24 Turnaround: 16 ROW: NA	No room for terminal except middle of street Does not provides direct connection to Bayshore
7	F-Market Line Extension: Broadway/Powell St./Mason St. (surface/ In mixed traffic)	3.0	Capital: 38 O&M: 3.6 Vehicle: 7.5	AM Peak - 23 min. PM Peak - 28 min. Weekend - 29 min.	NA	15	At Station: 90 Terminal: NA ROW: NA	Not within exclusive ROW. Would operate in mixed-flow traffic and be subject to traffic delays Does not provide direct service for Bayshore and East Bay patrons
8	F-Market Line Extension: Broadway/Columbus Ave./ Mason St. (surface/ In mixed traffic)	2.7	Capital: 34 O&M: 3.5 Vehicle: 7.5	AM Peak - 18 min. PM Peak - 22 min. Weekend - 25 min.	NA	13	At Station: 78 Terminal: NA ROW: NA	Not within exclusive ROW. Would operate in mixed-flow traffic and be subject to traffic delays Does not provide direct service for Bayshore and East Bay patrons
9	F-Market Line Extension: Broadway/Powell St. / Jones St. (surface/ In mixed traffic)	3.1	Capital: 39 O&M: 3.6 Vehicle: 7.5	AM Peak - 24 min. PM Peak - 29 min. Weekend - 30 min.	NA	15	At Station: 90 Terminal: NA ROW: NA	Not within exclusive ROW. Would operate in mixed-flow traffic and be subject to traffic delays Conflicts with cable car on Columbus Does not provide direct service for Bayshore and East Bay patrons

Notes:

(1) Costs for F-Market Line Extension are additional costs over planned F-Market Line Service.

Capital costs for surface rail estimated at \$18 million per mile of single track, \$25 million double track. Does not include The Embarcadero.

Operating and Maintenance costs at \$10.26 per train mile. O&M costs calculated for service between Market/17th and Chinatown

Vehicle cost for F-Market service at \$750,000 per train. To provide additional service for Chinatown extensions

(2) Travel times do not include terminal layover times. Represent times for incremental service for Chinatown extension portion of service

(3) Stations north of Market Street for tunnel alignments, and west of The Embarcadero for F-Line and Bayshore extensions from The Embarcadero

NA - Not Applicable

extension from The Embarcadero within semi-exclusive right-of-way along Washington Street and a portion of Kearny Street (between Washington and Jackson), and in mixed-flow traffic on Kearny Street (between Jackson and Broadway) and Broadway would serve the Chinatown and North Beach areas. Five stations would be provided, including a terminal at Kearny Street between Washington and Jackson Streets. In order to provide for sufficient turning radius for the tracks, some right-of-way may need to be acquired at the corner of Washington Street.

Parking loss associated with this alternative includes approximately 22 spaces at the stations and 8 spaces on Kearny Street between Washington and Jackson Streets (location of terminal), and 67 spaces on Washington Street for the light rail right-of-way.

Capital costs for this alternative would be approximately 23 million, substantially less than the subway alternatives. Operating costs would also be less than for either of the subway alternatives. As noted above, any Bayshore Corridor extension into Chinatown would actually represent a minimal increase in the operating and maintenance cost of the proposed Bayshore Corridor, as the Chinatown extension would be constructed in lieu of an extension via subway on Third Street or extension into the MUNI Metro tunnel on Market Street.

Following evaluation of this alignment, it is recommended that this route be dropped from further consideration. The northbound approach of Kearny Street to Broadway is at an uphill grade of 10.9%, which exceeds general design standards for light rail operation.

Bayshore Alignment 4: via MUNI Metro Extension and F-Market line, with access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street and Jackson Street, Drumm Street and Washington Street

This alignment is similar to Alignment #3, except that the return to The Embarcadero would be via Jackson Street, Drumm Street and Washington Street instead of Broadway. This alignment avoids the problem with the steep grade on Kearny Street approaching Broadway.

This extension would have similar capital and operating costs as Alignment #3 above, and would serve Bayshore and Visitacion Valley patrons, however, travel times would be slightly longer due to the single lane that would be shared by autos and light rail vehicles on Jackson Street. In addition, any blockage of the street by activities associated with the commercial establishments would impact the operating speed and reliability of the Bayshore service.

Upon evaluation of other options, the Washington/Kearny/Jackson/Drumm/Washington loop alternative was also considered less desirable than other alignments. The Washington/Kearny/Jackson/Columbus/Washington loop described below would provide for better operating conditions for the light rail vehicles.

Bayshore Alignment 5: via MUNI Metro Extension and F-Market line, with access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Columbus Avenue and Washington Street

This alignment was developed after evaluation of the two short loop alignments described above. This alignment proposes to route the Bayshore Corridor extension from The Embarcadero on Washington Street westbound within its own right-of-way at the northern curb lane to a Kearny Street terminal. It would then loop back to Washington Street (where it would be located in an exclusive lane at the southern curb lane) via Jackson Street and Columbus Avenue. Two westbound travel lanes would be maintained on Washington Street for vehicular traffic. This alternative would require the removal of parking at either side of Washington Street and Kearny Street, and would require the widening of Washington Street between Drumm and Davis Streets to accommodate the two lanes for the light rail and two lanes for auto traffic.

Figure 13 presents a conceptual plan for a portion of this service on Washington Street, as well as the terminal area. This terminal would provide for a platform between two tracks. Two tracks are required at the terminal to allow for a second light rail vehicle train stop at the terminal while the previous light rail vehicle train is taking its layover. In order to provide sufficient turning radius for the tracks, some right-of-way may need to be acquired at the corners of Kearny Street at Washington Street and at Jackson Street. In addition, the design efforts for the terminal would need to be coordinated with existing plans for the proposed residential building and school on the currently vacant lot.

In response to community review of the terminal on Kearny Street, concerns were expressed about the amount of traffic on Kearny Street and the potential for conflict with a planned school drop-off zone. A terminal on Washington Street between Montgomery and Kearny Street was evaluated with the following findings:

- The provision of exclusive right-of-way on Washington Street for terminal would require approximately 31 feet of the 40 foot wide roadway, leaving only 9 feet for the travel lane. Both parking lanes would have to be removed and the 10 foot sidewalks would need to be narrowed to provide for an 11 foot travel lane.
- Based on preliminary evaluation, it seems that existing traffic on Washington Street (300 to 400 vehicles per hour) could potentially be accommodated within the single lane. The planned double left turn lane from The Embarcadero onto Washington Street would more than double the traffic flow on the eastern most section of Washington Street, but only about 40 to 80 vehicles during the peak periods would continue on Washington to the block between Montgomery and Kearny.
- Parking would need to be eliminated from only the eastern curb of Kearny Street between Washington and Jackson Streets.
- This alternative would require slightly less of a corner taking to provide adequate turning radii at the Washington/Kearny and the Kearny/Jackson Street intersections.

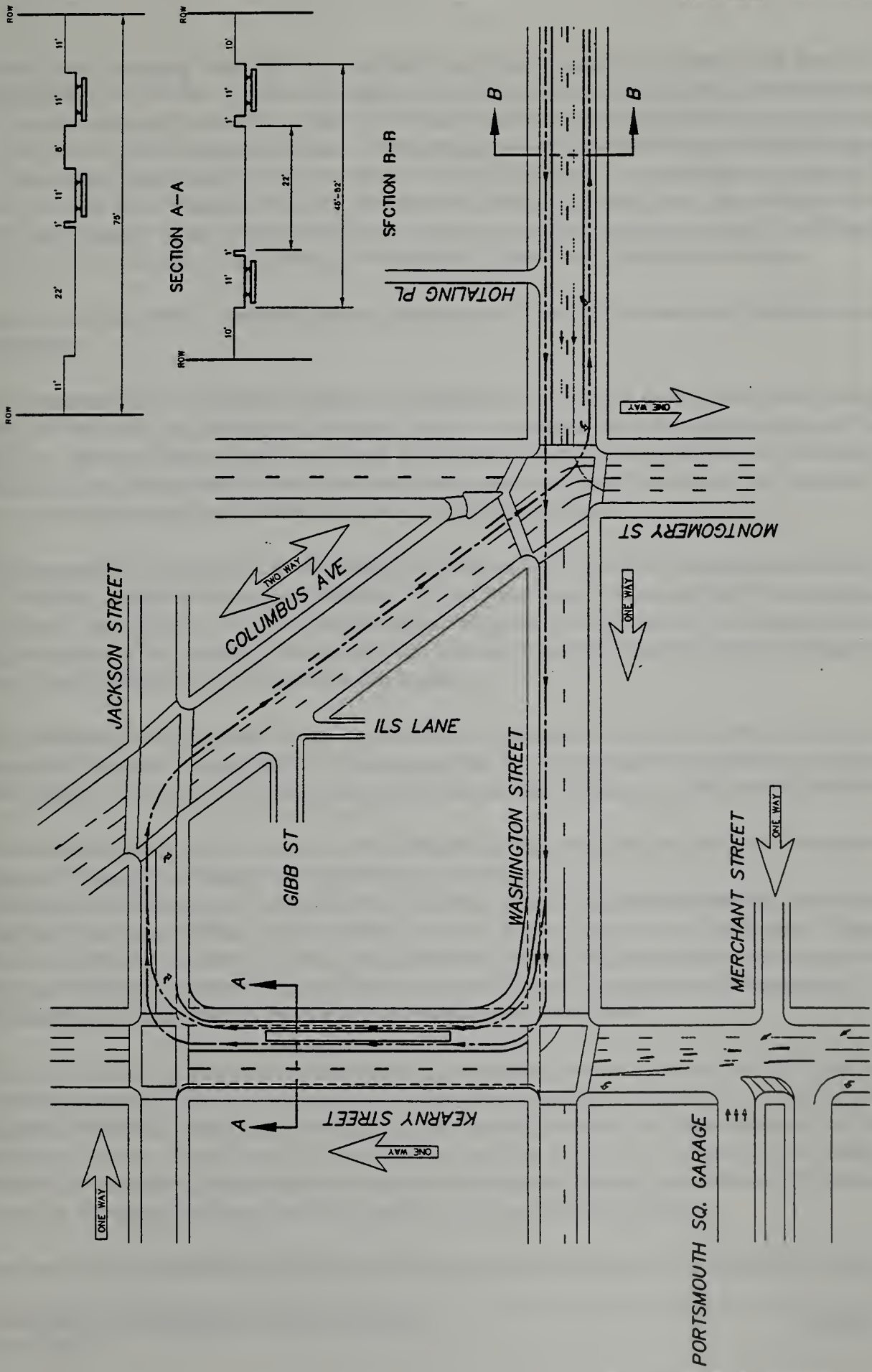


Figure 13

CONCEPTUAL RAIL PLAN
WASHINGTON ST/JACKSON ST LOOP

Capital and operating costs for this alternative alignment would be similar to the two loop alternatives noted above. However, the alignment would require the loss of parking to reserve the curb lanes for the light rail tracks. Parking loss would include approximately 60 van-pool parking spaces and 12 metered bicycle spaces. The Washington/Kearny/Jackson/Columbus/Washington loop was determined to be the most favorable of the loop alignments. This extension would provide direct service into Chinatown from the Bayshore and Visitacion Valley area, the potential for a terminal on Kearny Street and more favorable operation conditions, particularly reliability, and travel times due to an exclusive right-of-way on Washington Street for both directions of travel.

Bayshore Alignment 6: via MUNI Metro Extension and F-Market line and into Chinatown via Broadway

The Broadway "stub" alignment involves the extension of the light rail in the center two lanes of traffic on Broadway to just east of Columbus Avenue. A terminal would be located at the end of the line. Semi-exclusive right-of-way could not be accommodated on Broadway, as Broadway serves as a major east/west access route and traffic operations would be substantially impacted. In addition, parking along the entire route would need to be removed.

Capital costs for this alignment would be approximately half of the costs for Alignments #3 through #5, however, operating costs would be similar. Travel times would also be similar to the previous alignments, as would the number of stations and parking loss. The terminal for this Broadway stub alignment would be located in the median two lanes and would require the loss of parking on Broadway (approximately 16 spaces) at this location.

The Broadway stub alignment is not as desirable as Alignment #5, as it would not provide a convenient terminal location, and a terminal would need to be located in the middle of a major traffic street. It also does not provide as effective service into Chinatown as the loop alignments.

F-Market Line Alignment 3: access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street and Broadway

F-Market Line Alignment 4: access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Drumm and Washington Street

F-Market Line Alignment 5: access into Chinatown from The Embarcadero via a one-way loop on Washington Street, Kearny Street, Jackson Street, Columbus and Washington

F-Market Line Alignment 6: access into Chinatown via Broadway

The four Washington loop and the Broadway alignments that were evaluated for the Bayshore Corridor extensions were also evaluated as F-Market line extensions. As shown on Table 7, the number of stations, travel times and parking loss would be similar to those identified for the Bayshore Corridor. Capital costs for the extension from The Embarcadero would also be similar. However, the operating and maintenance costs for providing the F-Market line service to Chinatown would be substantially greater than the Bayshore Corridor surface extensions.

The operating characteristics of the planned F-Market service to Fisherman's Wharf were reviewed

with MUNI. The potential for rerouting some of the planned service to the Chinatown extension was examined and it was determined that rerouting was not an option, and instead additional service would need to be added specifically for the Chinatown extension. Therefore, the Chinatown extension would be a new service from Upper Market into Chinatown. Approximately six additional streetcars would need to be obtained for the Chinatown service, and the operating and maintenance costs for this service would need to cover the entire line, from Upper Market into Chinatown.

The F-Market extension into Chinatown would provide access for visitors from Upper Market and the downtown retail, hotel and financial districts. It would allow for connections to BART and the ferries at the Ferry Building. The F-Market line extension, however, would *not* provide for a direct connection between Bayshore/Visitacion Valley, Chinatown and the East and South Bay. Based on anticipated future travel demand characteristics, this connection will become even more important in the future.

As under the Bayshore Corridor extensions, Alignment #5, which would be routed on Washington/Kearny/Jackson/Columbus and Washington would provide the best connection for Chinatown. However, a Bayshore Corridor extension would be more desirable than the F-Market line based on the high capital costs (vehicles and track) and operating and maintenance costs for the F-Market line extension and capability to serve demand.

F-Market Line Alignment 7: access into Chinatown from The Embarcadero via a loop on Broadway, Powell Street, Columbus Avenue, Mason Street to Fisherman's Wharf

This alignment of the F-Market line was developed following field surveys of Chinatown and North Beach roadways. This alignment proposes to route the F-Market line extension from The Embarcadero on Broadway westbound within mixed-flow traffic to Powell Street, where it would continue to Columbus Avenue and to Mason Street. This extension would continue to Jefferson Street, where it would utilize the proposed F-Market line tracks to continue westbound to Jones Street and then to loop eastbound to Beach Street. It would continue on Beach Street to Mason Street, where it would return to Chinatown and The Embarcadero via Mason, Columbus, Powell and Broadway.

This extension would operate within mixed-flow traffic and would be subject to delays, particularly on the congested one lane streets such as Powell Street. Exclusive lanes for the light rail could not be accommodated within the existing right-of-way without eliminating curb parking along the route. During field surveys Powell Street between Broadway and Vallejo was very congested, and this congestion would certainly affect the ability of the extension to provide reliable service. Due to congested street and a longer alignment than the Alignments #3 through #6, travel times for this trip would be longer. As a result approximately ten additional light rail vehicles would be required for this extension.

This F-Market extension into Chinatown would provide access for visitors from Upper Market and the downtown retail, hotel and financial districts. It would allow for connections to BART and the

ferries at the Ferry Building. This alignment would serve as an alternate route for visitors to Fisherman's Wharf. The planned F-Line alignment along The Embarcadero would, however, be more direct and quicker due to the exclusive right-of-way alignment for the entire extension to Fisherman's Wharf including median operation of the F-Line on The Embarcadero, and the ability to provide signal pre-emption for the light rail vehicles. This alignment would also serve visitors between Fisherman's Wharf and Chinatown.

The alignment of the extension on Broadway would not be as convenient for Chinatown visitors as the Washington routes (Alignments #3 through #6), as it would deliver visitors to the edge of Chinatown.

Capital and operating costs for this additional service would be substantial. Approximately \$7.5 million would be required for additional vehicles, \$3.6 million for operating and maintenance costs and \$38 million for the tracks. The additional service would not be as cost-effective as the Bayshore Corridor extensions given that the small number of visitors between Fisherman's Wharf and Chinatown that would utilize this route. For the F-Market line local ridership between Fisherman's Wharf and Chinatown is small compared to demand from Bayshore, East Bay and San Francisco east of Van Ness Avenue. Therefore, this route as an extension to serve Chinatown is not recommended.

F-Market Line Alignment 8: access into Chinatown from The Embarcadero via a loop on Broadway, Columbus Avenue, Mason Street to Fisherman's Wharf

This alignment is similar to Alignment #7, except that rather than using Powell Street to travel northbound to Fisherman's Wharf, Columbus Avenue would be used. This route would avoid the delays associated with travel on Powell Street, and therefore travel times would be somewhat shorter than under Alignment #7. However, this route would not serve Chinatown as well as would the Powell Street alignment.

F-Market Line Alignment 9: access into Chinatown from The Embarcadero via a loop on Broadway, Powell Street, Columbus Avenue, Jones Street to Fisherman's Wharf

This route is a variation of the F-Market line extension into Chinatown proposed by the community. The community had extended this route to Leavenworth Street, and an adjustment was made to reflect that Jones Street, rather than Leavenworth Street, is western end of the F-Market line.

This alignment is similar to Alignments #7 and #8 with respect to the costs, station locations and parking loss. Travel times would be slightly longer than either Alternative #7 or #8. In addition, this alignment would conflict with the operation of the cable car on Columbus Street. While it would be possible to accommodate both tracks, there would be an impact on the operation of the cable car. For this reason, this alignment is recommended.

Summary of Rail Alternatives:

The extension of the proposed Third Street/Bayshore Corridor LRT into downtown, and into Chinatown via tunnel along Stockton Street or Kearny Street via new Central Subway Tunnel should be studied as planned.

If resources do not permit short term implementation of the Bayshore Corridor via Central Subway into Chinatown, alternative treatment via existing/planned surface LRT should be explored. The preferred alignment for evaluation should be an extension from The Embarcadero into Chinatown via Washington/Kearny/Jackson/Columbus/Washington Streets. This spur would connect the proposed Third Street/Bayshore corridor with Chinatown, and connect Market Street MUNI bus lines, the F-Market line, ferry service and BART with Chinatown. The extension of the Bayshore Corridor into Chinatown would be more cost-effective than an F-Market line extension.

In order to ensure the viability of the Bayshore Corridor extension into Chinatown via Washington Street the following actions should be taken:

- Configure the intersection of The Embarcadero/Washington Street with the appropriate roadway and F-Market line alignment and profiles to facilitate future construction of surface rail.
- Reserve adequate right-of-way for the Bayshore surface rail alignment, especially on Washington Street to allow future rail service. Preliminary analysis indicates that a portion of Block 203, which previously contained the Washington Street off-ramp from the Embarcadero Freeway, will be required.
- Should an F-Market line rail connection to Chinatown be pursued in the future, the Washington/Kearny/Jackson/Columbus/Washington Street loop is still recommended as the most desirable route. Full funding has yet to be identified for construction of such a rail connection.

Other Improvements

California Cable Car: A possible improvement to the California cable car line has been identified that would improve accessibility to Chinatown through the provision of a new "California-Hyde" service. See Figure 12. This new route would serve as an additional route to Fisherman's Wharf. The new cable car service would follow a combined California and Powell-Hyde cable car alignment; the cable cars would follow California Street from Market to Powell, and then follow the Powell-Hyde alignment to Fisherman's Wharf.

It is estimated that service on the line would amount to double that currently on the California line, with all the new service being allocated to the new California-Hyde line (about 488 one-way trips per day). Approximately eight to nine new cable car vehicles would be required to operate the service. This improvement would provide substantially increased cable car capacities through

Chinatown.

Education/Transit Service: Develop tourist brochure for transit routes to tourist destinations, including Chinatown to facilitate use of transit and discourage auto use.

Enforcement: Enforcement of traffic rules and parking regulations in and adjacent to Chinatown, as described in section 4.3, would also serve to facilitate transit service to and through Chinatown. The enforcement discussion in section 4.3 identifies the actions needed prior to an aggressive enforcement action. Streets heavily used by transit, particularly Stockton, Sacramento, Clay and Kearny Streets, should be the primary focus of the enforcement.

Better Coordination of Transit Runs and Schedules: MUNI should be requested to provide better supervision of this activity.

6. PARKING/GOODS MOVEMENT

This section presents the issues regarding goods movement, which includes local commercial loading/unloading, and parking for visitors to Chinatown.

6.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY

The following parking and goods movement issues were identified by the community during the public workshops on December 28, 1995 and January 16, 1996, and during preliminary meeting with various Chinatown community organizations.

- Parking supply within Chinatown is inadequate to serve demand
- Local commercial trucks park in loading/unloading zones all day
- On-street parking conflicts with bus and vehicular traffic flow
- Local commercial trucks occasionally block sidewalks
- It is feasible to construct a parking garage at the intersection of Broadway/The Embarcadero, but the Port wants to have parking near Ferry Building for retail success of Ferry Building. The intersection of Washington/Drumm doesn't need more congestion. There should not be parking on 202/203.
- Intercept garage on The Embarcadero and another near Galileo H.S. football field (take #19 into Chinatown)
- Tourist education
- Parking restrictions like in Noe Valley, but someone noted that shopping patterns are different, that shoppers always look for better bargains
- truck meters on Stockton are abused
- more vehicles now on east/west streets turning onto north/south streets, which are always backed up
- lack of short term and long term parking
- Emphasize use of the St. Mary's Garage on Sundays, when people are in the area attending the neighborhood churches, consider patterns and how they relate to use of garage.
- Consider remote parking sites for smaller trucks and vans.

6.2 SUMMARY OF ISSUES

The issues can be summarized into two general topics:

- The parking supply in Chinatown is inadequate to serve the needs of Chinatown. Of primary concern is the need for off-street facilities within Chinatown or adjacent to Chinatown but easily accessible, to support the Chinatown visitor shopping patterns. In addition, many visitors drive directly to the Portsmouth Square garage, causing queues and congestion on the streets adjacent to the garage, while other garages are underutilized.

- Truck loading/unloading within Chinatown is generally within on-street metered spaces and restricted to 30 or 60 minutes. These regulations are often disregarded by trucks which parking in front of the businesses all day, thereby forcing other trucks to double park while loading/unloading. This substantially limits the availability of loading/unloading facilities for trucks, blocks transit and auto traffic and results in congestion on the street.

6.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS

Parking Program: The parking supply that is currently available to Chinatown visitors was evaluated and it was determined that improvements to the existing program should be pursued prior to construction or use of intercept parking facilities.

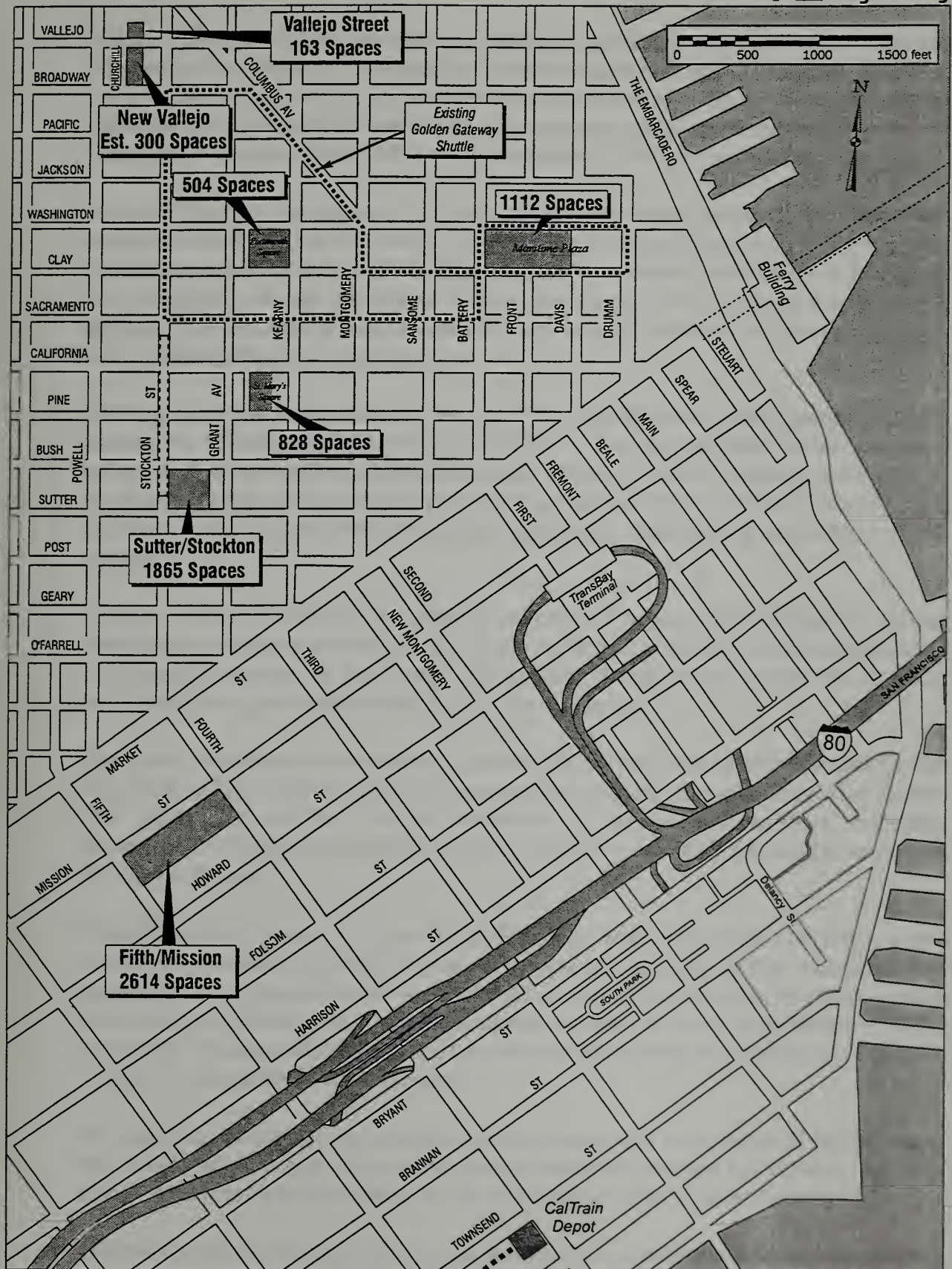
A parking program should be developed for Chinatown for weekday and weekend conditions to include the Portsmouth Square Garage, St. Mary's Garage, the existing and the New Vallejo Street Garages, Sutter/Stockton Garage, Golden Gateway Garage and the Fifth/Mission Street Garage. This program should focus on accommodating visitors to the Chinatown area closest to their destination first, at the Portsmouth Square, St. Mary's and Vallejo/New Vallejo garages, and then extend to adjacent garages including the Golden Gateway, Sutter/Stockton and 5th/Mission garages. The program should include: street signing, informational brochures, amended rate structures, and transit and vicinity maps in parking garages.

For each of the parking garages proposed for inclusion in the program, specific recommendations are presented. Figure 14 presents the location of these garages.

- Portsmouth Square Garage - The Portsmouth Square garage is the primary garage for Chinatown. This garage fills up quickly and queues for entry into the garage extend onto Kearny, Clay and Washington Streets.

At the Portsmouth Square garage, a procedure should be developed to identify alternate garages when Portsmouth is full. For example, a variable message sign could be placed south of St. Mary's garage to indicate that Portsmouth is full and that St Mary's should be used as an alternate. Similarly, a variable message sign could be placed at the northbound left turn from The Embarcadero onto Washington Street to indicate the use of the Golden Gateway garage and shuttle.

- St. Mary's Garage - St. Mary's garage is on the southern border of Chinatown and generally serves the downtown community during weekdays. However, parking spaces are available during the weekday evenings and weekends. In addition, this garage is soon to undergo seismic upgrades which are scheduled to be an 18 month process. As part of upgrade an elevator will be constructed with direct access to St Mary's Square. This improvement will facilitate access to Chinatown.



CHINATOWN AREA STUDY

Figure 14

PARKING GARAGE PLAN FOR CHINATOWN

Based on discussions with the Parking Authority, the parking rate structure could potentially be modified by lowering the rates during week nights and weekends to be similar to Portsmouth Square Garage. Lowering the rate structure could be made possible by the implementation of self-park operations. Lower parking rates would encourage use of St. Mary's for Chinatown visits, including Sunday visits to the nearby churches.

The need for a shuttle between St. Mary's garage and various destinations in Chinatown were discussed with the community. While St. Mary's is very close to Chinatown, due to the shopping patterns, a shuttle would be attractive for shoppers, particularly on weekends. It is possible to reroute the existing Golden Gateway shuttle to pass by the St. Mary's garage. This possibility should be explored following the completion of the seismic retrofit and marketing program for St. Mary's.

- Existing and New Vallejo Street Garage - The existing Vallejo Street garage provides parking for Chinatown and North Beach visitors. The planned New Vallejo garage is anticipated to undergo the design/approval efforts in 1996, including working with community groups. An alternate design currently pursued by the Parking Authority could provide for 300 spaces within the existing height limit, resulting in a net addition of 163 spaces.
- Golden Gateway Garage - This facility currently has a substantial amount of parking available for additional parkers. As part of the parking program for Chinatown, measures to increase utilization of this garage and existing shuttle service should be pursued, particularly during the seismic retrofit of St. Mary's garage.

The existing shuttle service operates on weekends, generally between the hours of 10:00 AM and 6:00 PM. Existing ridership levels could be improved with promotion of the shuttle. This could be conducted through publication of schedule, routes/stops, merchant participation. The effectiveness of the shuttle should be examined following promotion of St. Mary's Garage.

- Sutter/Stockton Garage - The Sutter/Stockton garage, while adjacent to Chinatown, has a substantial number of parking spaces and available capacity during weekdays and weekends. This garage should be considered as part of the Chinatown program, as it is within walking distance and has a substantial number of transit lines directly serving Chinatown. Measures to enhance the use of MUNI and walking from garage to Chinatown could be implemented and encouraged.

For example, the garage has available parking spaces and lower range of parking rates, this should be promoted. Signs within garage should be provided to indicate which exits to use to access MUNI lines (#15, 30, 45) and walking paths to Grant Avenue.

Discussion with the Parking Authority has revealed the possibility of rerouting the existing Golden Gateway shuttle to the Sutter/Stockton Garage and St. Mary's. The garage

revenue should be considered in the underwriting of potential additional transit service. This service should be considered after the other measures are introduced.

- Fifth/Mission Street Garage - Promote use as an intercept garage for Chinatown and downtown visitors. Link this garage with Chinatown via existing transit service (#30) or a possible shuttle such as the proposed electric trolley or motorized cable car shuttle between 5th/Mission Garage and downtown and Chinatown via Mission Street, Main/Drumm Street, Sacramento Street and Stockton Street. The use of the Fifth/Mission garage as an intercept garage should be pursued following the other parking improvements described above.

The provision of an intercept parking garage adjacent to the I-80/U.S. 101 freeway off-ramps, combined with transit service to Chinatown, was raised by the community as a potential solution to the parking and congestion problem in Chinatown. The implementation of a program to coordinate the supply and demand for parking in the Chinatown area should first be explored using existing remote parking such as the Fifth & Mission garage linked to transit or special shuttle service.

The concept of an intercept facility is often used at the periphery of congested urbanized areas to meet the needs of long-distance commuters. These facilities (generally park-n-ride lots) attract commuters who would otherwise drive to their destinations and are likely to reduce the number of vehicles on congested roadways and freeways. For the commuters the attraction is to transfer to public transit or rideshare vehicles in advance of congestion points for convenience and possible reduced travel times. Section 3.2 presented the travel times for routes between the regional freeways and the intersection of Stockton/Broadway in Chinatown. The travel times represent only a small component of the total time for travelers accessing Chinatown and using I-80 and U.S. 101.

An intercept facility adjacent to the ramps would not relieve visitors to Chinatown from the congestion on the freeways and therefore the major attraction for using an intercept garage would be eliminated. The travel time between the intercept facility and Chinatown would be longer than parking as close to Chinatown in facilities with available capacity (i.e. St. Mary's, Golden Gateway) and utilizing a shuttle or transit to the final destination.

Enforcement: Provide Parking Control Officers (PCOs) for enforcement of existing traffic regulations (no parking in red zones, no parking during towaway hours, no blocking of intersections) and loading zones for commercial buildings. Before initiating an intensive enforcement program, conduct community outreach. (See section 4.3 for discussion of enforcement program)

Parking Guide Signs: Provide signage to privately-owned public parking garages such as 550 Kearny Garage (on Sacramento), 601 Montgomery Street Garage and 750 Kearny Garage, to reduce around the block search for parking and illegal parking.

7. PEDESTRIANS

This section presents the pedestrian issues within Chinatown.

7.1 ISSUES/OBSERVATIONS PRESENTED BY COMMUNITY

- Tourists are often not aware that Chinatown is within walking distance from Union Square
- Tourist education is needed
- Coordinate hotels with walking destinations and walking times
- All-pedestrian system good for pedestrians: consider locations at Stockton/Jackson and Stockton/California
- Pedestrian walkways - flyovers at Stockton and Broadway
- Look at entire downtown and how to use kiosk to get general orientation maps (get Decaux to do it)
- Use banners to move people - trailblazers

7.2 SUMMARY OF ISSUES

High levels of pedestrian activity are one of the most characteristic features of Chinatown. While the high levels often result in slow pedestrian speeds and impede pedestrian movement on sidewalks, these conditions have been accepted as an integral character of Chinatown.

Pedestrian issues raised by the community generally focused on methods to discourage visitors from driving to Chinatown and further congesting the streets, and walking instead. At community meetings, the fact that visitors are often not aware that Chinatown is within walking distance from Union Square was often repeated. Improvements to educate visitors on proximity of Chinatown to downtown and North Beach and providing destination guide signs were recommended.

7.3 DISCUSSION OF POTENTIAL SOLUTIONS/RECOMMENDATIONS

Destination Guide Signs: A program that evaluates the existing guide signs for Chinatown and North Beach should be implemented. Signage in the form of signs or banners should be strategically located in Union Square, Chinatown and North Beach. The possibility of utilizing the new kiosks for similar information should be explored.

Informational Brochures: The destination guide signs should be supplemented with the provision of informational brochures and maps on scenic and walking routes in Union Square, Chinatown and North Beach. This information would serve to encourage walking and using transit, rather than driving, to major tourist destinations.

Encroachment of Merchant Sidewalk Encroachment Violations: Presently merchants are allowed a 2 foot encroachment from the property line, through the DPW permit process, into the sidewalk for display of merchandise. The 2 foot encroachment may be violated or merchandise may be

stored on the sidewalk. Enforcement should be given a high priority- to ensure pedestrian flows are accommodated to the greatest extent possible. Also truck vendors sell merchandise from their vehicles, this activity is subject to police vendor permit and should be enforced.

8. SUMMARY OF RECOMMENDATIONS

8.1 TRAFFIC SOLUTIONS

- Extend peak period No Parking/Towaway on Sacramento and Clay Streets to facilitate vehicular traffic and transit flow.
- Improve signage on I-80/Bay Bridge, U.S. 101, I-280, ramps and local streets for traffic destined to Chinatown and North Beach to help visitors find Chinatown.
- Educate visitors through brochures and signing as to best routes to take to Chinatown and locations of parking garages in order to facilitate access and reduce drivers circling around Chinatown looking for on-street or off-street parking. Encourage the use of Broadway, Battery and Hyde Streets as attractive routes to U.S. 101 and I-80.
- Provide additional Parking Control Officers (PCOs) for enforcement of existing traffic regulations (no parking in red zones, no parking during towaway hours, no blocking of intersections). Before initiating an intensive enforcement program, conduct outreach to community.
- Interconnect Stockton Street and Grant Avenue, and possibly Broadway to the downtown signal system. The potential for a westbound left turn from Broadway onto Stockton should be explored, and the potential for improving signal coordination at intersections that are on travel routes to parking garages should be included in this project.
- Review signal timing on Montgomery Street - Improvements to traffic flow could be achieved by maintaining all-pedestrian phase, but changing the cycle length to be consistent with adjacent streets (i.e., 60 seconds)
- Conduct comprehensive study of travel/traffic patterns in Northeast Quadrant of City. As part of this study evaluate the potential of changing street directions of east/west streets, i.e., Sacramento, Clay, Washington, Jackson was completed.

8.2 TRANSIT

Bus Transit

- Evaluate potential for adding bus islands and bulbs to facilitate bus loading/unloading.
- Extend Route #83 to The Embarcadero to provide connection to the F-Market line service via Broadway, Davis Street and The Embarcadero.
- Provide a viable transit lane for the #15 line to improve travel times through downtown, such as the proposed use of a portion of Sansome Street as a contraflow lane.

- Request Golden Gate Transit to initiate bus route #69 (the ferry shuttle) service on weekdays to serve Chinatown.
- Request SamTrans to extend their commuter bus routes from Foster City (47F, 48F and 49F) to weekends.
- Pursue the planned provision of articulated buses on the #30 Stockton line to provide for additional capacity on this route.
- Request better coordination of transit runs and schedules.
- Request short-term transit improvements on the #38 Geary and the #9X San Bruno.

Rail

- As planned, study the extension of the proposed Third Street/Bayshore Corridor LRT into downtown, and into Chinatown via tunnel along Stockton Street or Kearny Street via new Central Subway Tunnel.
- If resources do not permit short term implementation of the Bayshore corridor via Central Subway into Chinatown, alternative treatment via existing/planned surface LRT should be explored.

Study rail connection from The Embarcadero into Chinatown via Washington - Kearny - Jackson - Columbus - Washington Streets. This spur would connect the proposed Third Street/Bayshore corridor with Chinatown, and connect Market Street MUNI bus lines, the F-Market line, ferry service and BART with Chinatown.

- Configure the intersection of The Embarcadero/Washington Street with the appropriate roadway and F-Market line alignment and profiles to facilitate future construction of surface rail.
- Reserve adequate right-of-way for the Bayshore surface rail alignment, especially on Washington Street to allow future rail service. Preliminary analysis indicates that a portion of Block 203 will be required.
- The extension of the Bayshore Corridor line into Chinatown would be more cost-effective and serve a broader market for Chinatown than an F-Market line extension into Chinatown.
- Should an F-Market line rail connection to Chinatown be pursued in the future, the Washington/Kearny/Jackson/Columbus/Washington Street loop is still recommended as the most desirable route. Full funding has yet to be identified for construction of such a rail connection.

Cable Car

- Pursue the potential for the provision of a new "California-Hyde" service. This new route would serve as an additional route to Fisherman's Wharf, and would increase service between downtown and Fisherman's Wharf by 50 percent, and to Chinatown via the Powell-Mason line by 33 percent.

Other

- Develop tourist brochure for transit routes to tourist destinations, including Chinatown to facilitate use of transit and discourage auto use.
- Continue to encourage traffic improvement measures throughout in Chinatown and the vicinity, and enforcement of traffic and parking regulations. Particularly on Stockton, Sacramento, Clay and Jackson Streets.

8.3 PARKING/GOODS MOVEMENT

- Develop parking program for Chinatown for weekday and weekend conditions to include the Portsmouth Square Garage, St. Mary's Garage, the New Vallejo Street Garage, Sutter/Stockton Garage, Golden Gateway Garage and the Fifth/Mission Street Garage. Program should focus on accommodating visitors to the Chinatown area closest to their destination first. This program should include: street signing, informational brochures, amended rate structures, and transit and vicinity maps in parking garages.
- Provide Parking Control Officers (PCOs) for enforcement of existing traffic regulations (no parking in red zones, no parking during towaway hours, no blocking of intersections) and loading zones for commercial buildings. Before initiating an intensive enforcement program, conduct community outreach.
- Provide signage to privately-owned public parking garages such as 550 Kearny Garage (on Sacramento), 601 Montgomery Street Garage and 750 Kearny Garage, to reduce around the block search for parking and illegal parking.

8.4 PEDESTRIANS

- Signage for pedestrians between Union Square, Chinatown and North Beach
- Informational brochures and maps on scenic and walking routes in Union Square, Chinatown and North Beach area.
- Enforcement of merchant sidewalk encroachment violations.

APPENDIX A

SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS BASED ON DELAY

Level of Service	Typical Delay (sec/veh)	Typical Traffic Condition
A	≤ 5.0	Insignificant Delays: No approach phase is fully utilized and no vehicle waits longer than one red indication.
B	5.1 - 15.0	Minimal Delays: an occasional approach phase is fully utilized. Drivers begin to feel restricted.
C	15.1 - 25.0	Acceptable Delays: Major approach phase may become fully utilized. Most drivers feel somewhat restricted.
D	25.1 - 40.0	Tolerable Delays: Drivers may wait through more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.
E	40.1 - 60.0	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long queues of vehicles form upstream.
F	> 60.0	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.

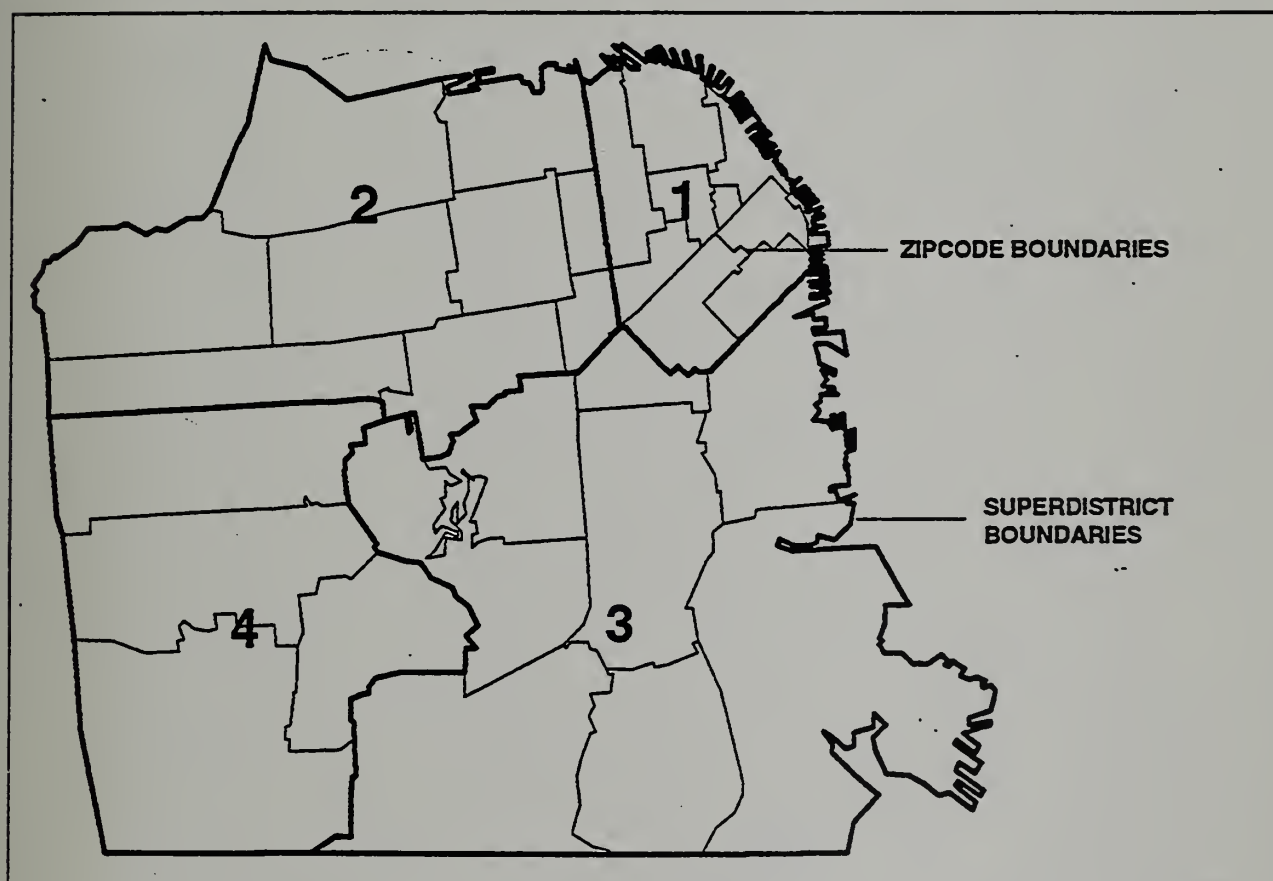
Sources: *Highway Capacity Manual*, Highway Research Board, Special Report No. 87, Washington, D.C., 1985; *Interim Materials on Highway Capacity*, Circular 212, Transportation Research Board, 1980.

ALL-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE DEFINITIONS

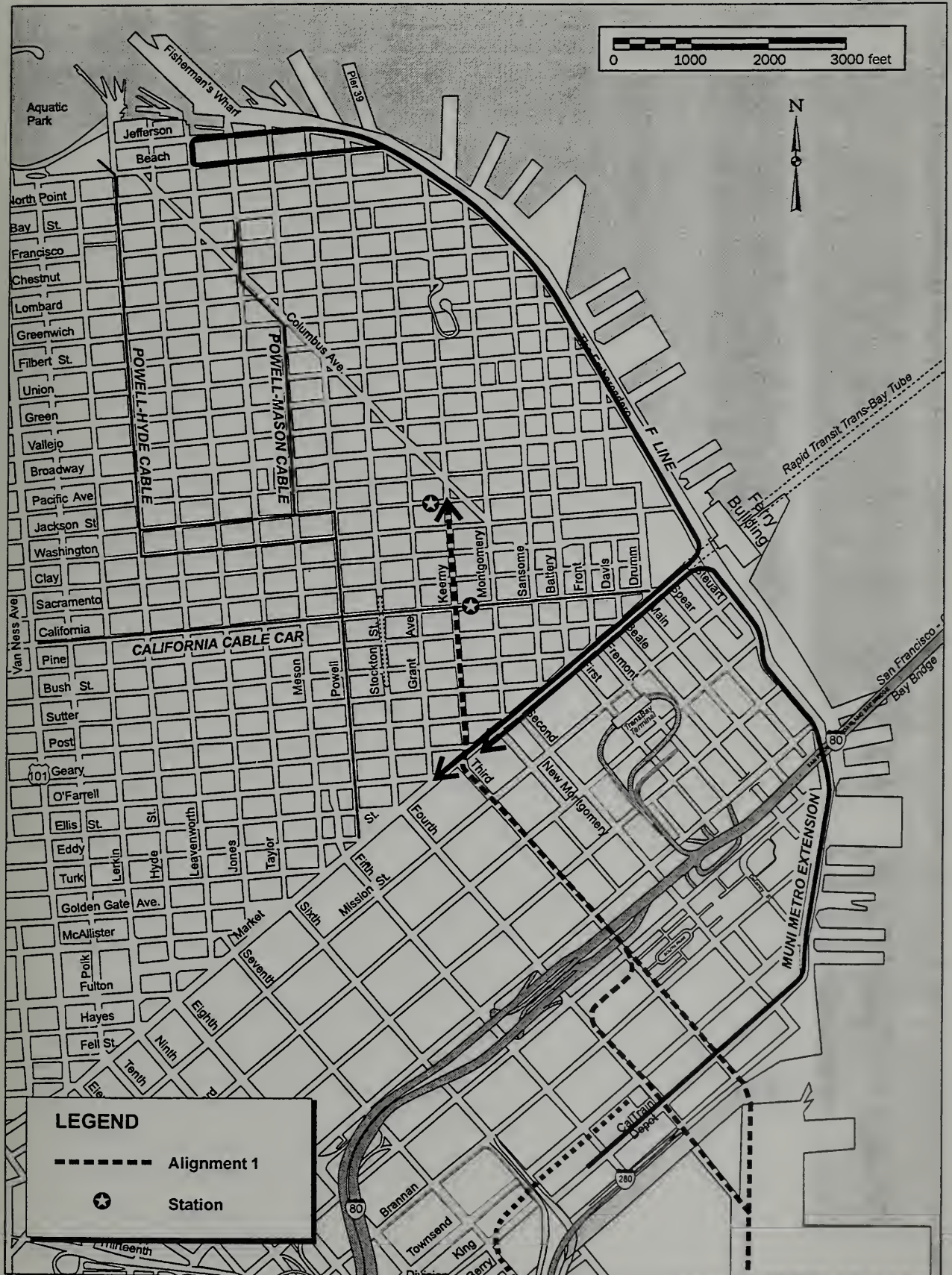
Level of Service	Typical Delay (seconds/vehicle)
D	≤ 5.0
B	5.1 - 10.0
C	10.1 - 20.0
D	20.1 - 30.0
E	30.1 - 45.0
F	≥ 45.0

Sources: Transportation Research Board, Circular 373; Dowling Associates.

FIGURE 1 - MAP OF SAN FRANCISCO SHOWING SUPERDISTRICT BOUNDARIES

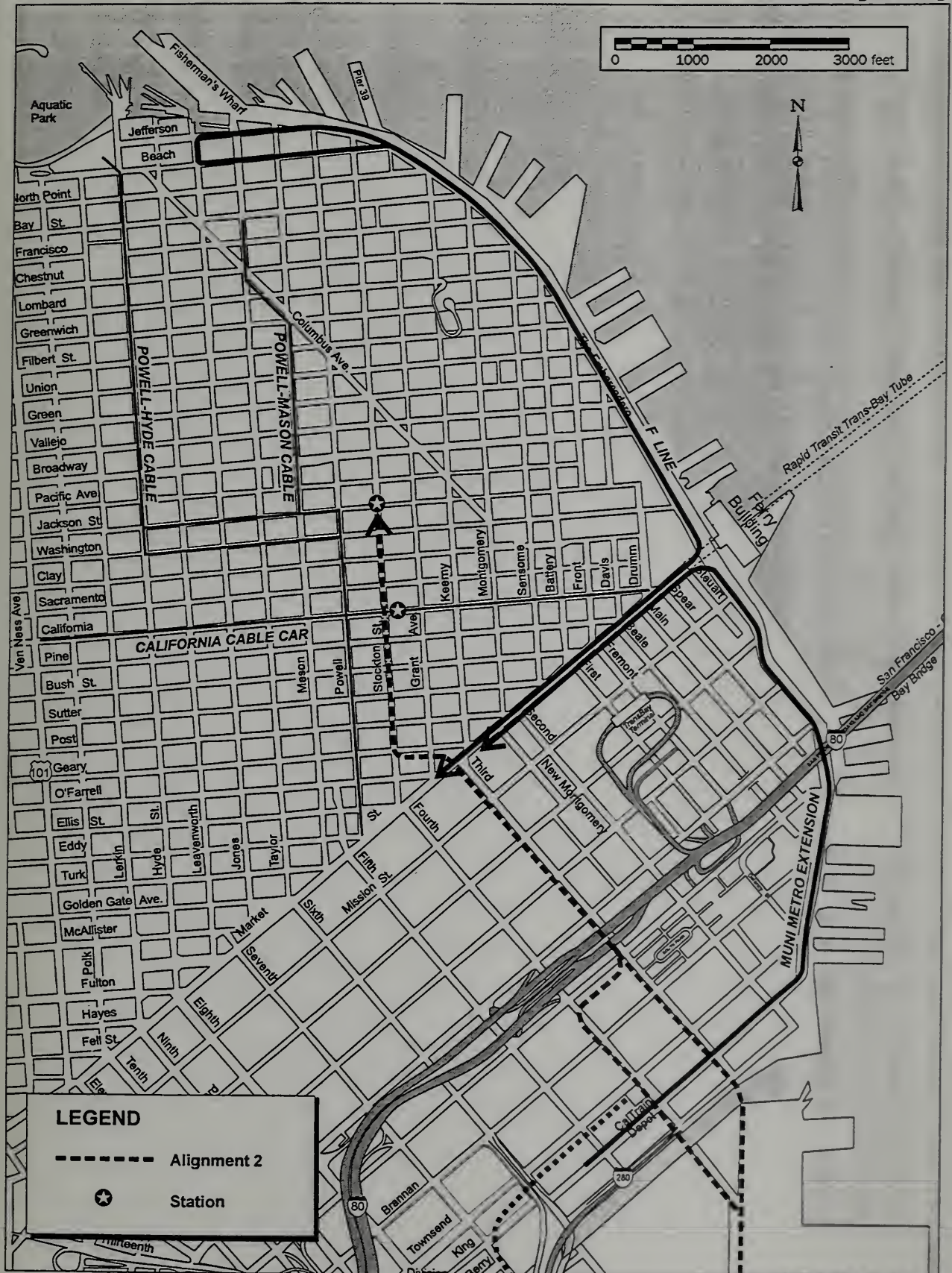


APPENDIX B



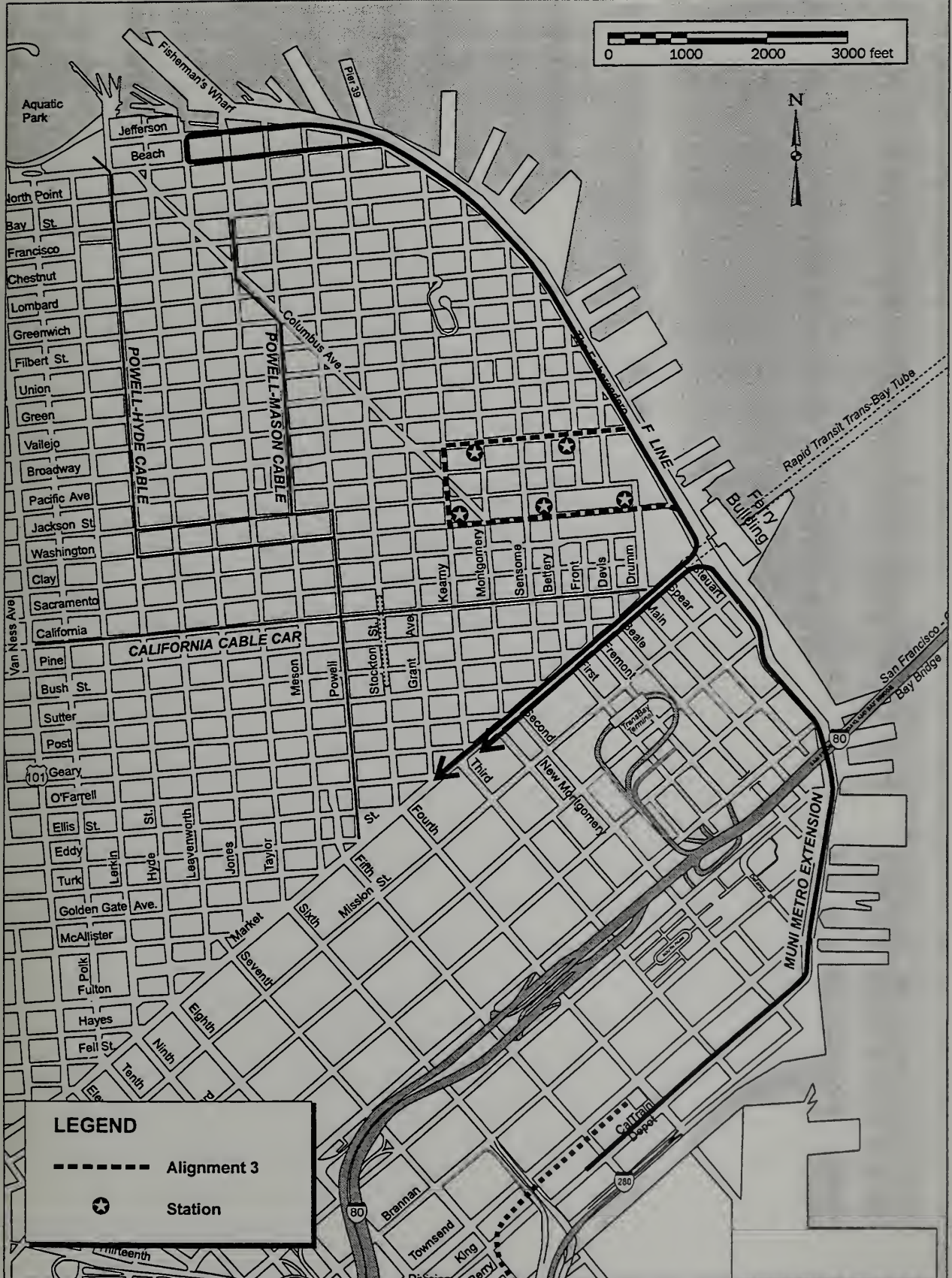
CHINATOWN AREA STUDY

Figure A-1
ALTERNATIVE 1



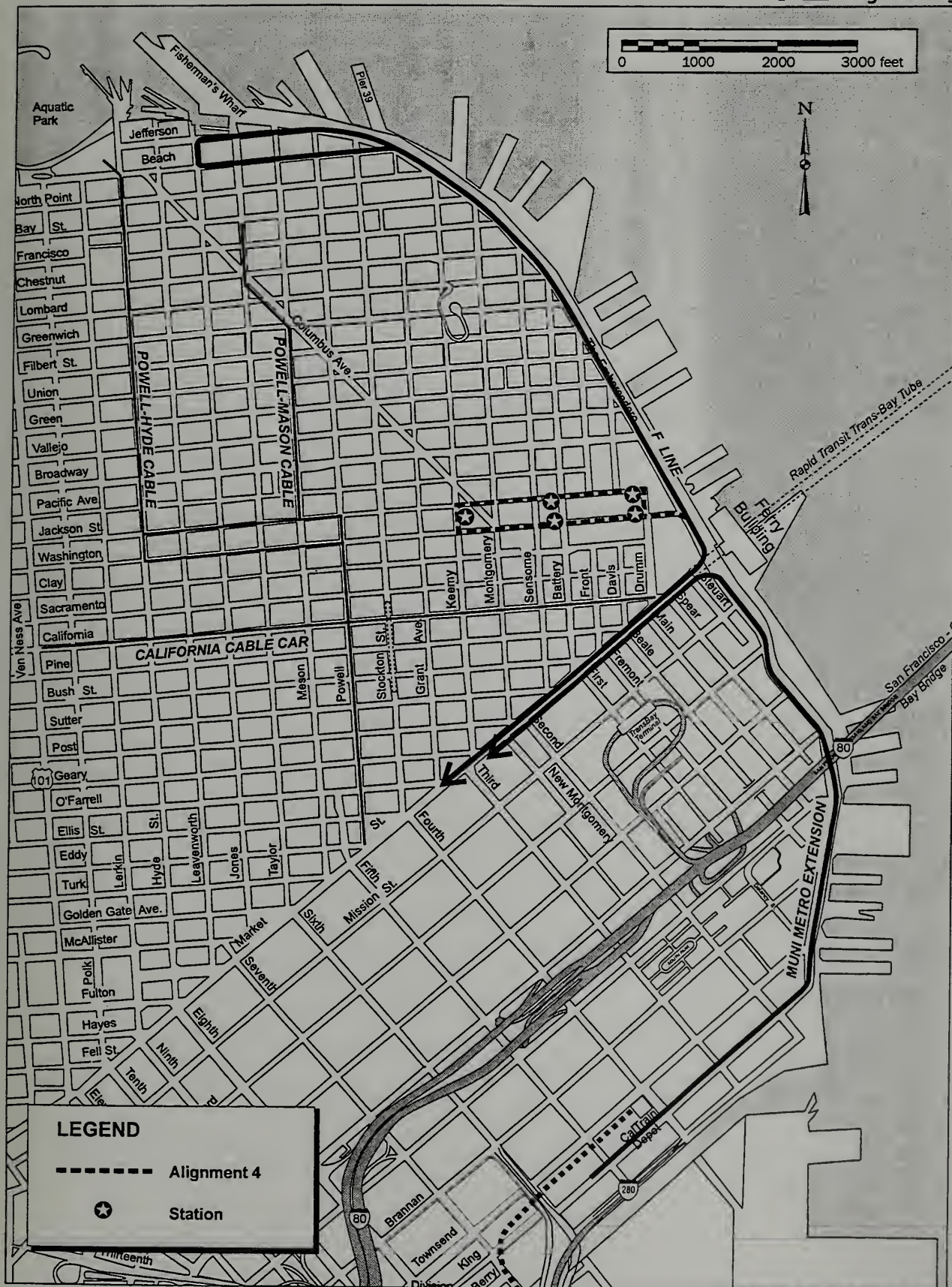
CHINATOWN AREA STUDY

Figure A-2
ALIGNMENT 2



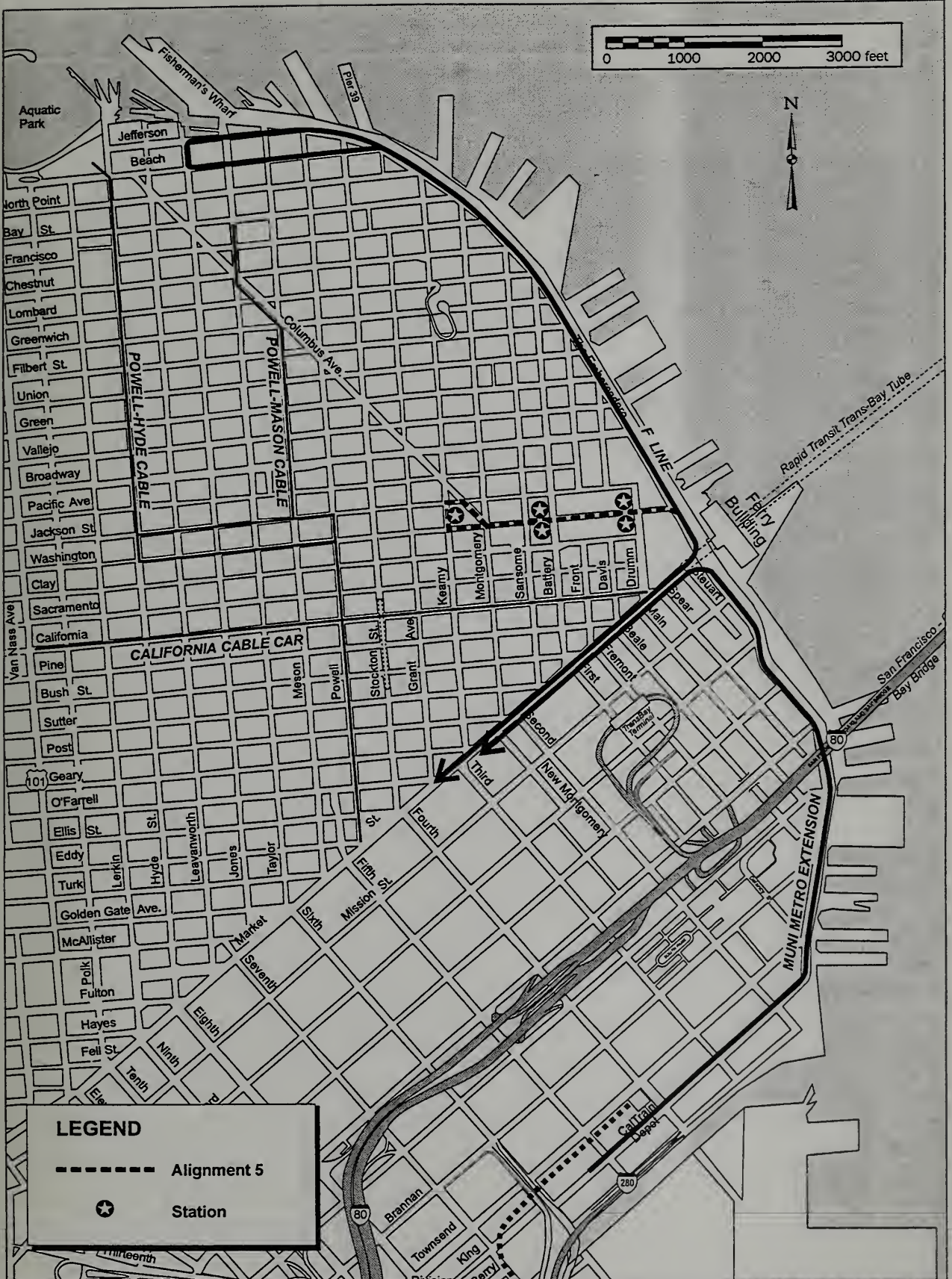
CHINATOWN AREA STUDY

**Figure A-3
ALIGNMENT 3**



CHINATOWN AREA STUDY

**Figure A-4
ALIGNMENT 4**



CHINATOWN AREA STUDY

Figure A-5
ALIGNMENT 5

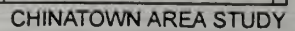


Figure A-6
ALIGNMENT 6

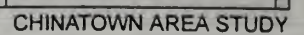
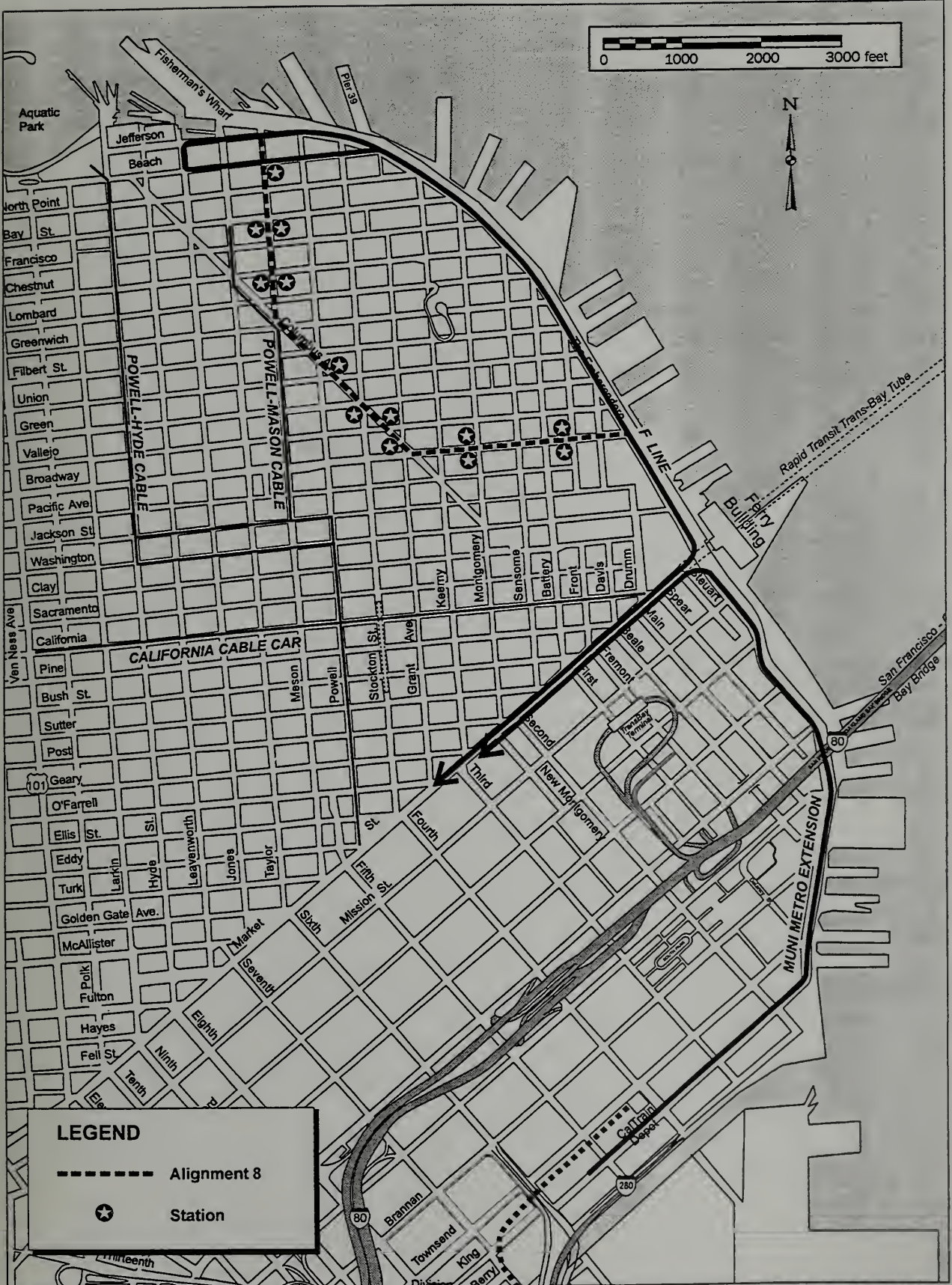
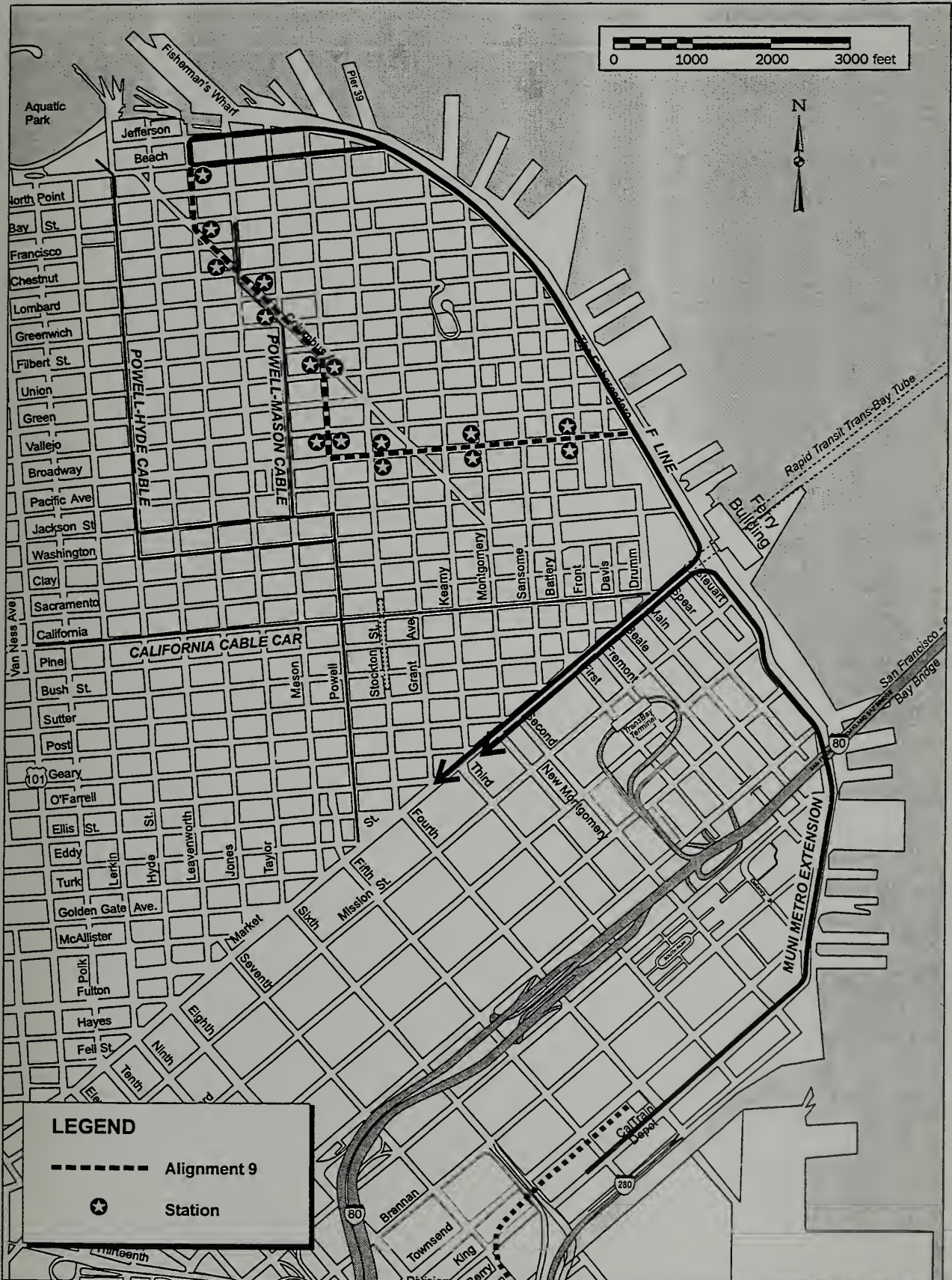
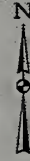
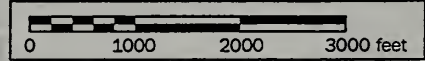


Figure A-7
ALIGNMENT 7



CHINATOWN AREA STUDY

Figure A-8
ALIGNMENT 8



CHINATOWN AREA STUDY

**Figure A-9
ALIGNMENT 9**

